FROM THE EDITOR

Donald Moss, PhD

The cover of this issue of the Biofeedback Newsmagazine shows the Riviera Hotel in Las Vegas, scene for the March 20-24, 2002 AAPB annual meeting. The meeting theme is The Circle of the Soul: The Psychophysiology of Mind/Body/Spirit. I encourage every member of AAPB to mark your calendar and attend this outstanding conference, which will highlight spiritual dimensions in health care, the growing importance of complementary and alternative medicine, and psychophysiological research on transpersonal topics. The meeting will also include a wide sampling of scientific and clinical programs on applied psychophysiology and biofeedback.

This issue of Biofeedback Newsmagazine opens with several articles on professional issues: Seb Striefel's article prepares the practitioner to cope with new federal guidelines on patient privacy, security of client/patient information, and access to alternative treatments. Roxann Intriligator addresses important issues of treatment adherence. Gabe Sella challenges researchers and clinicians to greater standardization in instrumentation, practitioner training, and signal analysis.

A multi-author article on headache is also included in the Professional Issues section. This article presents AAPB's official position paper, supporting the efficacy of biofeedback for headache. The article rebuts a research report by William Mullally, publicized by a Reuters Health press release in May, 2001. Mullally claimed that biofeedback is an extremely costly and time-consuming treatment, offering no benefits for migraine and tension headache. The AAPB position paper has already led to a new press release by Reuters Health, much more positive on the use of biofeedback for headache.

This issue also includes two articles on heart rate variability, the first a discussion of spirituality and positive emotions, by Doc Childre and Rollin McCraty, and the second a report on a doctoral dissertation using heart rate deceleration as an index for attention in optimal performance applications.

Jeff Bolek discusses the continuing relevance of learning theory principles for sEMG applications and motor learning.

Rae Tattenbaum reports on an interesting “work in progress,” using EEG neurofeedback to assist professional opera singers in their performances.

Reviews of two books are included here, one regarding spinal cord injury and the other on attention deficit disorders. Under Brief Reports, we discuss an American Academy of Neurology report supporting the use of biofeedback for children's migraines, a must-read article by Ken Holroyd and colleagues reporting a controlled trial study on headache, and an NCCAM proposal for research on the placebo.

Proposals and Abstracts are invited for special issues on: Advances in Instrumentation for Spring 2002 (Editor Richard Sherman, PhD), Applied Psychophysiology and the Performing Arts for Fall 2002 (Editor Marcie Zinn, PhD), and Mind/Body Pediatrics for Spring 2003. The editor also welcomes proposals for future special issues of the Biofeedback Newsmagazine.
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Items for inclusion in Biofeedback should be forwarded to the AAPB office. Material must be in publishable form upon submission. Deadlines for receipt of material are as follows:

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- March 15 for Summer issue, published June 15.
- June 1 for Fall issue, published September 15.
- September 1 for Winter issue, published January 15.

Articles should be of general interest to the AAPB membership, informative and, where possible, factually based. The editor reserves the right to accept or reject any material and to make editorial and copy changes as deemed necessary.

Feature articles should not exceed 2,500 words; department articles, 700 words; and letters to the editor, 250 words. Manuscripts should be submitted on disk, preferably Microsoft Word or WordPerfect, for Macintosh or Windows, together with hard copy of the manuscript indicating any special text formatting. Also submit a biosketch (30 words) and photo of the author. All artwork accompanying manuscripts must be camera-ready.

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Practice Implications of a New Law and Two Pending Laws

Sebastian “Seb” Striefel, PhD, Logan, Utah

Abstract: Practitioners should begin preparing to implement the provisions of “The Health Insurance Portability and Accountability Act” which requires all health care providers to meet new federal standards for transactions, privacy, and security of client/patient information. Compliance requirements are being phased in over a two-year time period after each set of final regulations are published. “The Access to Medical Treatment Act of 2001” would allow patients to legally access drugs and medical devices recommended and provided by health care practitioners. This Act is a recognition of the importance of allowing patients to chose treatments not approved by the FDA. “The Patient Protection Act of 2001,” better known as “The Patients’ Bill of Rights,” would attempt to make managed health care safer for patients by holding managed care companies accountable for the decisions they make. Practitioners may well wish to support passage of these Acts.

Introduction

“The Health Insurance Portability and Accountability Act” (HIPAA) became law in 1996. Its standards require major changes in how all health care providers manage information, including reimbursement, coding, security, patient records and care management. In addition, two Acts in the legislative process have provisions that would be helpful to biofeedback practitioners, if they were to become law.

HIPAA

The portability aspect of the law ensures that people with current or pre-existing conditions can get health insurance. Full compliance with the transactions regulations will be required by the fall of 2002, the privacy regulations by February 2003, and the security regulations shortly thereafter. Noncompliance with this law carries severe civil and criminal penalties, including fines of up to $25,000 for multiple violations of the same standard and $250,000 fines and/or jail terms of up to ten years for knowingly misusing patient information. Practitioners are encouraged to begin to familiarize themselves with the HIPAA regulations, to assign someone or a team to develop and implement a compliance plan, and to do a self-audit to determine the changes needed in current confidentiality and security practices versus those required by the new law (Kibbe, 2001a).

Transaction Regulations

The new transaction regulations require that all practitioners use the same format to transmit health related information. Electronic billing, claims status reporting, referral authorization and certification, and coordination of benefits will all be impacted (Kibbe, 2001a). Practitioners are encouraged to make sure that the software they use is in compliance with the formats required by HIPAA. These regulations will encourage practitioners to use electronic data submissions because the costs will be lower and the audit trails required by the law will be easier to establish and maintain.

Privacy and Security Regulations

The privacy and security regulations are intended to provide greater protection of patient confidentiality. Practitioners must ensure that all patient identifiable information, called “protected health information” (PHI) in the law, is secure. It includes obtaining patient consent to use PHI for delivery of health care, payment and routine practice activities, and for other uses such as, marketing or research (Kibbe, 2001a). Practitioners must define who has access to PHI, what information they can access (including record-keeping and secretarial staff), and how the information that is accessed will be protected. For example, practitioners must ensure that information is not compromised while on someone’s desk, while typing on the computer, at the fax machine, etc. In fact, logs must be maintained to ensure that recipients of information are identified (e.g., for faxes) to ensure that information does not go to the wrong person or place. The rules go so far as to require a logging of who accessed information, who sent a fax, what time it was sent, etc. The regulations are designed to discourage the current practice of open access to records within agencies and especially the current casual practices when information is sent elsewhere. Greater care must be taken that PHI does not fall into the wrong hands.

Security efforts must be taken to prevent unauthorized access to information (stolen by intent or sent to the wrong person), as well as loss of information because of accidents like fires or human error. Security measures can be administrative (e.g., policies and procedures), physical (e.g., locks and keys), and technological (e.g., encrypting records, passwords, records of computer use, etc.) (Kibbe, 2001a). Practitioners are encouraged to begin the preparation process now so that they can avoid feeling pressured later. Kibbe (2001b) provides additional information about HIPAA, relevant definitions, suggestions for doing a self-audit, information on other information sources, and steps to take now. Requirements similar to those in this law, in terms of security and privacy, have been dis-

**Access to Medical Treatment Act of 2001**

This Act (H.R. 1964) is currently in a committee consisting of representatives of both the House and Senate to see if they can resolve the differences that exist between the version passed by the Senate and that passed by the House. This bill would allow health care providers, who are authorized by the law of a State to prescribe drugs or devices, to provide or administer drugs or devices not approved by the FDA (Food and Drug Administration) to patients provided certain requirements are met, e.g., the patient has been examined by the practitioner personally, the patient agrees to treatment after having been informed of the risks, benefits, and alternatives available, including conventional treatments, etc. This Act recognizes that there are many safe and effective treatments that have not been approved by the FDA because of the time, costs, or lack of profitability of going through the FDA process for approval. For example, many treatments have been researched in other countries and found to be effective, but have not gone through the FDA process.

This bill would encourage preventive medicine and the use of natural remedies that are often cheaper and just as effective as conventional treatments (APMA, 2001). It would allow practitioners to use the treatments they believe are best for their patients without fear of censure or recrimination from their peers. Practitioners would still be held accountable for protecting the clients they serve and could still be sued if a client is injured. However, restrictions that exist against the use of unconventional therapies would change. For example, in California it is illegal for a physician to treat cancer with anything except radiation, surgery or chemotherapy, even if those treatments do not work (APMA, 2001). This law would allow the physician to try other options that have been shown to be effective but not approved by the FDA. For the biofeedback practitioner it could mean that the use of treatments that are considered unconventional by mainstream medicine would be encouraged if there is data supporting the effectiveness and safety of the treatment for patients, e.g., biofeedback.

**Patients’ Bill of Rights**

This Act (S. 1052), if passed, would guarantee patients a uniform, federal set of patient protections and would hold managed care companies accountable for some of the decisions that they make (Judge David L. Bazelon Center, 2001). Patients would have the right to appeal treatment denials, the right to sue in state court if they believe they were harmed by a medical judgment and its outcomes, and the right to sue in federal court if they believe they were harmed by an administrative decision, e.g., by a managed care company (Judge David L. Bazelon Center, 2001). The bill would even allow patients the right to access specialists outside of an insurance plan's provider network and prohibit incentives that make practitioners limit care to remain in a provider network. House Bill 2563 is similar to the Senate version and is the one that many professional organizations are supporting. The House of Representatives can be contacted toll free at 1-877-703-9491. This bill could help in the effort to make managed care organizations consider clients' well-being rather than profit in their decision making. It could even encourage physicians to make more referrals to credible biofeedback providers when it is in the interests of their patients to do so.

**Additional Websites**

Following is a list of websites that include useful information, such as copies of the law or acts, current status, and information on how to do a self-evaluation audit or otherwise rethink how you do things in daily practice. They include:

- [http://thomas.loc.gov](http://thomas.loc.gov)
- [www.aapb.org](http://www.aapb.org)
- [www.bazelon.org/alerts.html](http://www.bazelon.org/alerts.html)
- [www.dbhs.gov](http://www.dbhs.gov)

**References**


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Enhancing Treatment Adherence in Biofeedback

Roxann Intriligator, MS, R.N., C.S., Carmel, New York

Abstract: Treatment adherence, also known as patient compliance, is seen in behaviors such as attending sessions regularly and following the practitioner’s instructions. Promoting adherence is an important clinical issue in biofeedback therapy as in any other health care practice. By becoming aware of issues that interfere with adherence, and by developing attitudes and behaviors to enhance adherence, biofeedback clinicians can often prevent premature termination of treatment, foster active participation by the client and thus have a higher rate of successful outcomes.

Treatment Adherence: The Problem

Imagine this: Someone comes to see you for biofeedback for relief of headaches (or back pain or ADD or any other symptom). He tells you how much he wants to get better, the specialists he has consulted to no avail, and how he is willing to do whatever it takes to get relief. You expertly operate your equipment, demonstrate the mind-body connection and explain the benefits of self-regulation. He nods, says good-bye, and makes another appointment. Several days later he calls to cancel the appointment and you never hear from him again. What happened?

Or imagine this scenario: A woman comes in regularly for biofeedback sessions, during which you assign homework. Despite your detailed explanation of the importance of home practice, she does nothing that you ask of her in between sessions. She makes slow progress, and you believe she can do much better, but nothing seems to motivate her.

In order to develop a successful biofeedback practice, it is important to build and maintain a client base and reliable sources of referral. But it is also important to persuade clients to be actively involved and stay in treatment long enough to benefit from it. Many articles and workshops on marketing address how to get people in the front door, but keeping clients returning for their sessions and participating in their treatment is important too. The problem of patient non-adherence, seen in behaviors such as leaving treatment prematurely or failing to follow a treatment plan, is often neglected. One reason is that practitioners may feel a sense of failure when a patient quits or fails to follow instructions. Therapists often experience an array of feelings when this occurs, including anger, helplessness, frustration, bewilderment and even a sense of rejection. Yet non-adherence is common to all types of health care practices, affecting people with all types of disorders, and with all patient populations. Patients may comply with some part of their treatment plan and not others; they may comply more at one point in time then another. The phenomenon of non-adherence has been recognized since the time of Hippocrates. Today research has identified methods to identify potential areas of non-compliance as well as ways to promote treatment adherence.

Treatment adherence is more important today than ever before because of the changing structure of the health care field. As people live longer with chronic conditions, there is less emphasis on direct medical care and more emphasis on continuous self-management (Meichenbaum & Turk, 1987). Failure to follow a prescribed treatment plan can often mean the difference between health and illness, even to the point of risking death in serious disorders such as diabetes or heart disease. Yet, despite the importance of adherence, studies have shown adherence rates ranging from 4% to 92%, with the typical range reported as between 30% and 60%. All of our efforts to develop effective treatments are of little use if we lack the cooperation of our clients.

Paradigms for Understanding Non-Adherence

Different theories of psychotherapy discuss the concept of resistance, which can be seen as an underlying factor in noncompliance. Freud used the term resistance to describe the internal, paradoxical forces in each of us that create a struggle to become well versus the desire to avoid any change (Menninger, 1958). Resistance can be expressed in a variety of ways, such as leaving treatment early, missing sessions, tardiness, and delays in paying the bill. Although resistance may be seen as a negative trait, psychodynamic theory holds that it is present in everyone throughout every treatment, but may vary in intensity and form of expression. Later analytic theorists focused psychoanalytic therapy on the analysis of resistance, which they reframed as the individualized defense mechanisms or character armour of the patient (Anna Freud, 1946; Reich, 1945). Proponents of cognitive therapy do not assume that active resistance is always present in treatment, but when it does occur it reflects reasonable concerns based on dysfunctional beliefs (Davis & Hollon, 1999). Each of these theories offers an understanding of how fundamental and pervasive non-adherence is. Treatment non-adherence is widespread and complex, both a universal phenomena and a
illness and symptom variables also matter. Meichenbaum & Turk (1987) report that adherence is greater when symptoms are unpleasant or easily recognized, whereas adherence may be far less when the treatment is prophylactic and there are no distressing symptoms. Hypertension is a common example of a condition that has a poor rate of patient compliance.

The relationship between the health care practitioner and the patient plays a crucial role in the adherence process. The communication style and attitude of the practitioner are vital to therapeutic success. A warm, caring, approachable style in the context of a personalized treatment plan can greatly enhance adherence. A collaborative relationship between practitioner and patient is essential. To do this, the practitioner must come to see the problem as the patient sees it; fundamental to accomplishing this are effective listening skills and an empathic attitude.

Organizational and structural variables, such as continuity of care, the office setting and the support staff are also important. Even the nature of the referral process, such as the attitude of the person who referred and the way it was handled, will affect adherence. If a patient comes for treatment as a result of a marketing campaign, the style and message of the campaign will affect his or her expectations and participation in the treatment.

Research has identified many strategies that practitioners can use to improve patient adherence, but Meichenbaum & Turk (1987) suggest that techniques to enhance adherence, to be successful, need to be used in the context of a caring relationship in which the patient is seen as a knowledgeable ally. In general, what patients seem to want from a health care encounter is a clinician who is competent, that they receive adequate information about their problem, and that the atmosphere of the encounter be comfortable, warm and cooperative. In the context of this caring, collaborative relationship between practitioner and patient, specific strategies can be used to improve adherence.

Patient education, to be effective, must be more than merely giving information. Patients must be told why it is important for them to carry out the recommended action. Information should be well organized and given in small amounts at each visit. And throughout treatment, adherence issues, such as the benefits of adherence and roadblocks to adherence, need to be discussed.

Many behavior modification procedures can enhance treatment adherence. These techniques include self-monitoring, goal setting, behavioral contracting and reinforcement procedures. A combination of these strategies can be developed in an individualized plan for each patient.

Studies have shown that patient adherence generally decreases over time, but patient behaviors that become habitual are continued. Techniques such as relapse prevention and attribution retraining can help patients with the long-term maintenance of their treatment. Potential areas of non-adherence can be discussed and planned for within the context of the overall treatment plan. If the desired changes can be incorporated into a patient’s life, there is a greater likelihood that they will be continued.

Meichenbaum and Turk conclude their book with a discussion of why practitioners may not adhere to the recommendations of the authors to enhance adherence. The authors report numerous studies revealing the poor compliance rates of health care practitioners, both in their own personal health care as well as providing treatment to others. At the end of this article the reader could ask himself or herself what could be done to improve the adherence of patients, and, if he or she is not going to make any changes, why not? If we try to understand our own roadblocks to adherence, we may be better able to help our patients deal with their non-adherence.

Treatment Adherence in Biofeedback

In Biofeedback: A Practitioner’s Guide, Mark Schwartz and Associates (1995) discuss some of the issues of patient compliance specific to biofeedback training. Schwartz and Associates discuss professional and patient factors that affect compliance. Professional factors include the professional setting and office personnel; the referral source’s attitudes and behaviors; the provider’s characteristics, behaviors and interaction with patients; and the cognitive

Optimizing Treatment Adherence

In their book, Facilitating Patient Adherence, Meichenbaum and Turk (1987) discuss factors that affect adherence and strategies for enhancing it. I will summarize their approach here. The first factor they discuss is patient variables. Obviously, each patient is unique and comes with his or her own history, attitudes and behaviors, some of which will facilitate and some of which will hinder the process of change. Patient satisfaction is an important variable. Patients who are satisfied with the health care provider and the treatment regimen will be more compliant; dissatisfied patients are more likely to reject aspects of the treatment or quit. Satisfaction is closely related to whether or not a patient’s beliefs or expectations have been met. Patients may have unspoken fears or misconceptions that contribute to noncompliance. A health care provider may believe that a person is non-compliant due to ignorance or laziness, whereas the patient’s behavior may be the result of a rational and logical decision making process that differs from the practitioners’. The patient’s perspective, and how it may change over time, plays an important role in participation in treatment.

Treatment variables are also important. Treatment regimens that are very complex, lengthy and have a large impact on a person’s life are less likely to be followed than simpler, shorter and less intrusive ones. These findings of Meichenbaum and Turk are relevant to biofeedback. Biofeedback training places many demands on clients’ time and energy, unlike other treatment regimens such as taking medication. Many people seeking stress management are overloaded already, and the thought of undergoing such a “labor intensive” treatment can cause some people to quit after the first session.

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Patient education, to be effective, must be more than merely giving information. Patients must be told why it is important for them to carry out the recommended
preparation of patients. Patient factors include the patient’s perceptions, expectations and affect. As treatment proceeds, a variety of methods can be used to assess compliance, such as patient self-monitoring and periodic psychophysiological assessments.

Schwartz recommends possible interventions to enhance compliance. These interventions include instructing patients how and why to self-monitor with easy to use self-report systems; conveying that the records will be examined; and establishing sub-goals that can be reviewed and revised. He also suggests general considerations to promote compliance, such as successively approximating and shaping compliance, and having patients set their own goals. He states that compliance is a complex concept that requires preparation, ingenuity and persistence on the part of practitioners, as well as an acceptance of the less than ideal world of clinical practice.

Recent Research on Compliance in Psychotherapy

Recent research on compliance in psychotherapy, especially cognitive therapy, has relevance for biofeedback. A study by McGriff, Gitlin and Enderlin (1996) examined factors that affected attendance in psychotherapy. Their study found that higher first session ratings of the therapists’ “confidence of being helpful” were associated with better attendance at later sessions. The clients’ expectations about the efficacy of treatment also influenced compliance with follow up sessions. Bryant, Simmons, and Thase (1999) found that patients who were more compliant with homework responded better to cognitive therapy, and that the therapists’ consistent review of the homework was the best predictor of subsequent patient compliance. Schmidt & Bickel suggest that the quality of homework done in cognitive therapy, rather than the quantity, may be a better predictor of outcome. More research is necessary to better define the characteristics of “quality homework” in biofeedback.

Addis & Jacobson (2000) studied the role of homework compliance and acceptance of the treatment rationale in treatment outcome in cognitive-behavioral therapy for depression. Their findings suggest that both homework compliance and acceptance of the treatment rationale contribute to successful outcomes. The implications of this study for biofeedback are that these two factors should be incorporated into the treatment plan. As well as fostering homework compliance, biofeedback clinicians need to present the rationale for psychophysiological self-regulation in an easy to understand manner, and then clearly link this to what will be done in the session and how this can affect the presenting problem. If clients can understand and accept the rationale for treatment, both parties can proceed to focus on the work at hand.

Davis & Hollon (1999) discuss why cognitive therapy is not always successful, and use the concepts of resistance and noncompliance as possible explanations. The authors reframe these concepts as two questions: why don’t clients always do what we want them to do, and when they do, why doesn’t it always work? The authors propose that the answers to these questions fall into four categories: some clients have attitudes or beliefs that interfere with treatment; the slower than expected rate of change can create discouragement; the therapist can lack sensitivity or flexibility; or the treatment may not be appropriate for that client. If biofeedback therapy is not proceeding as expected, consider that the answer may lie in one of these categories, which can then be identified and addressed.

Conclusion

As for me, I know that my patients seem to be more adherent and have better outcomes when I am feeling most calm, centered and healthy. Taking care of ourselves frees us to focus on our patients and understand the issues that may be holding them back. Taking care of ourselves also tells our patients that we are “walking the walk” as well as “talking the talk.” We understand the implications of doing what we are asking them to do. The result can be a truly collaborative relationship through which our patients can heal and we can learn.

References


To Standardize or Not to Standardize, That is the Question

Gabriel E. Sella, MD, Martins Ferry, Ohio

Abstract: The author argues for standardization in the use of surface electromyography, EEG/Biofeedback and other biofeedback modalities, including standardization in instrumentation, practitioner training, and signal analysis. The development of normative databases is a critical step in standardizing the interpretation of biological findings. The author calls for AAPB to distinguish between well-documented applications of biofeedback and unsupported claims. He argues that biofeedback will receive greater credibility, through such standardization and quality assurance in technology and practice.

Objectives

The world of biofeedback is full of wondrous scientific findings about the human ability to learn control over mental, muscular or ‘autonomic’ nervous system processes. What is needed to spur further evolution in this process of learning and teaching self-regulation and biofeedback?

This author believes that further progress requires a concerted effort to develop standardized methodologies for training individuals. These better-trained individuals will then be better able to use various biofeedback modalities, in both research and clinical practice, in a standardized and scientific manner, at the same time relying on more accurately standardized biofeedback instrumentation.

The following article aims at documenting the scientific and clinical need for standardization of biofeedback methodologies. This standardization will necessarily include the teaching, training, and utilization of well-documented standardized treatment protocols. It will be especially useful in defining clinical objectives of treatment of neuromuscular disorders. This refers to treatment or training with any biofeedback modality. It will also be useful for neuromuscular, cardio-respiratory and possibly EEG/biofeedback training of athletes for the optimization of muscular and autonomic nervous system parameters in competition. Finally, it will help the objective of improvement of musculo-skeletal tasks in the workplace, i.e., improved ergonomics, as is badly needed in repetitive motion types of work.

Introduction

While very young children are expected as a matter of course in any society, to master toilet training, i.e., to change an unregulated, ‘autonomic’ visceral function into a conscious, self-regulated defecation & micturition function, any other self-regulation learning is regarded by society from a different perspective. Many researchers, teachers and students of self-regulation are regarded variously as quasi-scientific, ‘avant-garde’, esoteric, ‘alternative’ practitioners, etc.

At the very best, we have failed to successfully send the message about the benefits of learning and practicing biofeedback of any kind – for both health care and self-improvement. The value of biofeedback has not been transmitted adequately by the prospective teachers/trainers to the prospective trainees – those persons who would benefit from a clinical perspective. At the very worst, the message has been transmitted so poorly, that one wonders if it were not better if it were not transmitted at all until the right time and in the right way.

The Urgency of Distinguishing Empirically Documented Investigations and Treatments

A testimony to this present reality is the refusal of many insurance companies to pay for biofeedback modalities related treatments and investigations.

Have there been any claims of unsubstantiated benefits of biofeedback in the ergonomic, self-optimization or clinical fields? Have such claims been made for the purpose of self-enrichment of certain ‘experts’ or equipment manufacturers? Clearly, no physiological or psycho-physiological technique should make unsubstantiated claims of benefits, be that in investigative, diagnostic, treatment or training aspects. Substantiation requires the documentation based on the same rules and regulations for all health-related techniques, and biofeedback cannot be an exception.

AAPB should become a leader in dis-involving itself and its members from any party who would teach biofeedback as an esoteric subject rather than as a natural and wonderful physiological and psycho-physiological tool of self-regulation and self-optimization within the limits of the technique.

Standardization in Instrumentation

Present day biofeedback technology relies on electro-physiologic modalities and, more often than not, on computerized techniques. From a practitioner perspective, it is necessary to train professionals to qualify for practice within the limitations of one's
license and within one's field of expertise. We must more clearly identify which biofeedback practitioners can practice in each application area. The individual with a clinical vocational background will require training with certain biofeedback modalities for the purpose of learning how to use such knowledge in investigations and diagnostic workup as well as in the treatment mode. The individual with a background in the sports/athletic fields, or the individual trained in ergonomics, may learn different biofeedback modalities such as to be enabled to train different persons the most effective and efficient utilization of muscles and energy. At all times, any student of biofeedback should practice it only within the framework of his or her license and credentials.

From a manufacturer perspective, all equipment should be standardized such that quality control could be done by independent means to verify the precision of results obtained for any modality with different types of equipment.

The above statements are not to be considered exceptions to any rule, but rather the standard of the day.

After all, would we expect an EKG to be done with electrodes placed anywhere on the body the clinician feels like? How could one interpret an EKG if the electrode placements were not standardized and the equipment would not be standardized to show the same amplitudes of cardiac electrical activity? Would there be any use for such a test in terms of helping to identify cardiac dysfunction and gravity thereof? Surely, the same quality assurance that applies to EKG, applies or should apply to all other electro-physiological modalities, most of them utilized within the realm of biofeedback.

Parameters of Standardization in Biofeedback

A technical look at any biofeedback (electro-physiological) modality may find that a number of parameters of teaching and interpretation apply:

1) Normative standards. The units need to be defined in terms of equipment sensitivity as well as 'normal' and 'abnormal'. 'Normal' refers to the range of values found in a database, i.e., range found during testing measurements in a large, asymptomatic group of persons tested in a standardized manner. For instance, the peripheral temperature varies very closely around 37ºC or 97.4ºF. Once the normal range can be defined for a modality, 'abnormal' is defined in terms of the unit values obtained from the symptomatic persons, tested in the same standardized fashion for that modality.

If there is overlap between the range of values of the two subgroups, then the matter can be analyzed further in terms of the sensitivity, specificity and predictive values for that particular modality.

2) Signal analysis. An electrical signal by itself is void of any clinical or ergonomic interpretation. Any interpretation depends on the framework in which it is placed.

In terms of the biofeedback modalities, the simplest framework is that of rest versus activity (resting/ work paradigm) or relaxation versus tension (physical or psychological) states. Beyond that framework, pending on the modality, one needs to define signal analysis in terms of clinical or ergonomic parameters. It should be clear that biofeedback practitioners need to seek the compilation of large databases for each modality. The databases would be formatted from objective data gathered from testing pursued in a standardized manner. It will be possible to pursue such tasks only when practitioners and manufacturers agree on such standardization.

The final aim of signal interpretation relies on the signal analysis described above and also on the skill, experience and background of the clinicians and ergonomists involved.

3) Practitioner training. Training of the practitioners needs to be done in a judicious and scientific manner. Qualified teachers from various fields would provide well-rounded training, impressing upon students that no particular specialty has any monopoly on the subject.

One particular issue though is outstanding: Any trainee can practice biofeedback investigation and treatment or training only within the scope and limits of one's license. Un-licensed individuals may learn biofeedback modalities but practice them only in non-clinical conditions and for non-clinical purposes.

4) Equipment component. A number of experienced manufacturers exhibit and sell biofeedback equipment. Each one assures the prospective client about the quality of the equipment. No one actually offers any modality signal comparison with any other manufacturer since no standard of comparison (or 'white noise generator') has been agreed upon by the different manufacturers. The time has come for AAPB to call on the different manufacturers to talk to one another and agree to provide industry standards and means of comparison for the biofeedback clientele.

The ideal situation will be achieved when either a) any prospective client could hold in hand a ‘white noise generator’ for any biofeedback modality and go from one exhibitor stand to another to compare the ‘goodness of fit’ of similar instruments, or b) the manufacturers would provide a collective assurance about the goodness of fit of such values. Instrumentation like S-EMG or EEG/biofeedback, which relies on multiple channels, would be required further to provide documentation of signal differences among the different channels.

Such collaboration of instrument manufacturers is essential for the evolution of the biofeedback field. After all, any thermometer manufacturer must produce thermometers that give similar temperature results. No less should be expected from biofeedback equipment manufacturers.

Quality Standards

While ISO (quality assurance) evaluation and certification needs to become compulsory for any equipment, the gold standard needs to be intra- and inter- instrument comparison. Only the latter two will allow for real inter-test comparisons and possibility of meta-analysis of results of similar tests performed with different instruments. The considerations above are not unique to the biofeedback modalities, but to all old and new electro-physiological techniques.

Legal considerations make credible and reliable expert testimony dependent on all the items described above. Consider, for continued on Page 27
Biofeedback Can Help Headache Sufferers

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Reuters Health Network distributed a press release on May 8, 2001, based on research by William J. Mullally, stating that biofeedback is not an effective treatment for migraine and tension-type headaches in adults because it did not improve on results obtained by other standard treatments.

The Mullaly Study. In some respects, Mullaly’s report does not warrant a response. No research report was ever published, except as a presentation at the American Academy of Neurology meeting on May 8, 2001. A full methodological analysis of his study is not possible, because he has declined to provide a full description of his methodology and results to support his conference abstract.

According to Reuters Health, Mullaly’s subjects had been referred to a 6-week day-treatment program, which emphasized training in pain management. Pain management methods included instruction in relaxation, meditation, self-hypnosis, cognitive therapy, and art and movement therapy with a pain clinician. Then 33 randomly selected graduates were given ten weekly 50-minute EMG and thermal biofeedback sessions. According to Reuters, all patients showed statistically significant improvement, and the biofeedback-treated patients did not show any better rate of improvement than the others.

Without actual outcome data, it is impossible to determine exactly what happened in the Mullaly study. There are two possible explanations for the lack of group differences. It may be that all patients were cured or nearly cured of their symptoms by the six-week program, which already included most of the recognized effective treatments for headache, so that there would not be anything significant to add with biofeedback training. Alternatively, it may be that the ten weekly biofeedback sessions were not of sufficient quality to produce any improvement. We note, for instance, that there is no assertion that the biofeedback trainer was qualified or certified in Biofeedback – only that the trainer was “a psychologist.” But under the ethics code of the American Psychological Association, additional special training is required in order to practice in a specialty. Without added details, we cannot draw any conclusions from the Mullaly study.

Unwarranted Influence. Nevertheless Mullaly continues to influence opinion in health care by interview reports in such publications as CNS News, an online journal (Bowser, 2001). In the CNS News article, Mullaly is quoted as saying that biofeedback “is an extremely costly and time consuming treatment” that offers no benefits for migraine and tension headache. The statements about biofeedback clearly are unfounded based on the limited nature and specialized population of subjects in Mullaly’s study, and the abundance of contrary evidence. The Mullaly statements about biofeedback and headache were based on an interim report on one investigation that apparently included intractable chronic headache patients in an intensive treatment program. The Reuters press release gave the findings an undeserved credibility, and we
continue to hear that various physicians groups and other audiences are still reporting the Mullaly findings. Therefore the Biofeedback Newsmagazine is providing an opportunity for a rebuttal of Mullaly's conclusions.

The Human and Economic Costs of Headache. Headaches take a tremendous toll in human suffering, and cost employers millions of dollars each year in absenteeism, disability, and lost productivity. Headaches affect 91% of males and 96% of females in the course of their lifetimes. Chronic headaches are challenging to treat, accounting for about 18 million medical visits per year, and many patients continue to suffer in spite of extensive and expensive treatment (McGrady, Andrasik, Davies, et al, 1999).

The Efficacy of Biofeedback for Headache. We believe that Dr. Mullally is wrong, based on an abundance of research studies and clinical reports. Three decades of clinical practice and research have shown repeatedly that biofeedback can be helpful for patients with migraine, tension headache and mixed headache. Several authors have described effective treatment programs, typically including combinations of EMG biofeedback, thermal biofeedback, relaxation training, and cognitive behavioral interventions for tension type and migraine headache (McGrady, Andrasik, Davies, et al., 1999; Degood, Manning, Middaugh, & Davies, 1997; Schwartz, 1995a; Schwartz, 1995b). Patients routinely report reduced intensity or frequency of headache, and some report a complete remission, with a corresponding decrease in medication use.

Many other research investigations have shown clear benefits either from biofeedback alone, or from a combination of biofeedback with other treatments. Several meta-analyses (Blanchard, Andrasik, Ahles, Teders, & O'Keefe, 1980; Blanchard & Andrasik, 1987; Bogaards & ter Kuile, 1994; Haddock, Rowan, Andrasik, Wilson, Talcott, & Stein, 1997; Holroyd & Penzien, 1986, 1990; McCrory et al., 1996) and even more research reviews summarize the positive outcomes available for both tension and migraine headache. An NIH panel on the efficacy of behavioral and relaxation therapies for chronic pain found that EMG biofeedback was more effective than psychological placebo and equally effective to relaxation therapies for tension headache (NIH Technology Assessment Panel, 1996). McGrady, Andrasik, Davies et al (1999) refer to over 100 empirical studies judging the efficacy of biofeedback and behavioral therapies for headache. Their review finds approximately a 50% reduction in head pain following biofeedback/relaxation therapy and stress management training.

The National Headache Foundation has published Standards of Care for Headache Diagnosis and Treatment, which state that “biofeedback has been shown to be an excellent treatment in the long term management of migraine and tension-type headache disorders (NHF, 1999, p. 17).” The Agency for Health Care Policy and Research commissioned a meta-analysis of the available reports on behavioral interventions for migraine. Thermal biofeedback, relaxation therapy, and cognitive-behavioral therapies were found to be at least moderately effective for migraine, by comparison to waiting-list controls (Goslin, Gray, McCrory, et al, 1999). Another meta-analysis showed moderate effectiveness for EMG biofeedback, relaxation therapy, and cognitive-behavioral therapy in alleviating tension-type headache (McCrory, Penzien, Rains, et al, 1996). The meta-analysis by Holroyd and Penzien (1990) showed biofeedback/relaxation to be identical in effectiveness to propranolol, to date the most researched prophylaxis for migraine. Both of these treatments in turn significantly surpassed placebo and no treatment.

Qualitative Advantages of Biofeedback Treatment. Biofeedback also has particular advantages over most medical treatments for headaches. Not only can it produce long-term remission of symptoms, but it does so without side effects. On the contrary, common side effects of medical treatments of headache include weight gain, sedation, and impaired concentration, and headache medications frequently lose their effectiveness over time. There is even preliminary evidence to suggest that successful treatment with biofeedback and relaxation can result in substantial cost savings (Blanchard, Jaccard, Andrasik, Guarnieri, & Jurish, 1985).

Conclusion: Biofeedback Can Help Headache Sufferers. Clinical experience and research show that headaches remain a challenge for the physician and the patient. Many patients continue to suffer daily severe pain, in spite of heroic treatment regimens. Health care cannot afford to dismiss any intervention that benefits large groups of patients with “modest” improvement, and occasional patients with dramatic improvements. It is irresponsible for Dr. Mullaly to dismiss biofeedback overall, simply because one study of patients in an intensive headache program failed to show added benefit. It would be more responsible to limit one's conclusions to the conditions of this specific study. Mullaly's study apparently showed that severe headache patients, who have already had a wide variety of interventions in an intensive six-week program, showed no benefit from the addition of biofeedback to their program.

Null results from Mullaly's one small study do not negate the large quantity of other clinical and experimental research showing that biofeedback can effectively help many patients suffering from headache. For many patients, with mild to severe tension or migraine headache, biofeedback remains a valuable and risk-free approach to treatment.

References


Abstract: Heartfelt positive emotions, such as love, appreciation, care and compassion, have long been associated with spiritual experience. However, because of a fundamental lack of mental and emotional self-management, such emotions, and associated experiences of increased spiritual connectedness, remain largely transient and unpredictable events in most people’s lives. Here, we summarize our research that has linked sustained positive emotion to a distinct mode of physiological functioning, termed psychophysiological coherence. This mode, characterized by heart rhythm coherence, increased heart-brain synchronization and entrainment of diverse physiological oscillatory systems, is associated with increased emotional stability, improved cognitive performance, and a range of positive health-related outcomes. Additionally, individuals frequently report feelings of increased spiritual connectedness during psychophysiological coherent states. Using heart rhythm coherence feedback training, individuals can readily learn to self-generate the coherent mode and sustain genuine positive emotional states at will, thus establishing an internal environment that is conducive to fostering spiritual experience.

You feel a deep sense of peace and internal balance – you are at harmony with yourself, with others and with your larger environment. You experience increased buoyancy, vitality and flow. Your senses are enlivened – every aspect of your perceptual experience seems richer, more textured. Surprisingly, you feel invigorated at times when you would usually have felt tired and drained. Things that usually would have irked you just don’t “get to you” as much. Your body feels regenerated – your mind, at last, clear. At least for a period of time, decisions become obvious as priorities clarify and inner conflict dissolves. Intuitive insight suddenly provides convenient solutions to problems that had previously consumed weeks of restless thought. Your creativity flows freely. In this state of inner harmony and deep fulfillment, you experience a sense of greater connectedness – to other people, to a larger whole, perhaps to God, or to a higher aspect of yourself.

Positive Emotions and Spiritual Experience

Many people have at some point in their lives experienced a state similar to that described above. In many cases, individuals report that such “magical” moments or periods of time, described by many as states of increased spiritual connectedness, were triggered by the genuine experience of heartfelt positive emotion. Perhaps it was the feeling of being fully and profoundly in love with another person; or the experience of deep appreciation for another’s kindness; awe at the majesty of nature; or a sensation of joy and fulfillment spurred by one’s own creative accomplishments.

Religious scholars, artists, scientists, medical practitioners and lay authors alike have written extensively on the transformative power of positive emotions. Moreover, recent research corroborates what we have long known intuitively, providing objective evidence that positive emotional states may indeed be key to optimal functioning, enhancing nearly all spheres of human experience. Positive emotions have been demonstrated to improve health and increase longevity (Blakeslee, 1997; Danner et al., 2001; Goldman et al., 1996; Russek & Schwartz, 1997), increase cognitive flexibility and creativity (Ashby et al., 1999; Isen, 1999), facilitate “broad-minded coping” and innovative problem solving (Aspinwall, 1998; Fredrickson, in press; Isen et al., 1987), and promote helpfulness, generosity and effective cooperation (Isen, 1987).

The growing body of research linking positive emotion to the enhancement of physical, cognitive and psychosocial functioning could lead one to surmise that it may be in the natural evolutionary trajectory of our species to learn to increase positive emotional experiences to further advance our ability to function healthily and effectively in the world. This is hardly a new idea. Indeed, most religious and spiritual traditions, regardless of cultural context, have emphasized the value of experiencing and expressing positive emotions – sometimes referred to as the “qualities of the heart” – feelings such as love, care, gratitude, appreciation, compassion, tolerance, forgiveness. Throughout the ages, such positive feeling states have been recognized as a cornerstone of spirituality and frequently associated with transpersonal experiences.

It is now thousands of years since the earliest spiritual teachers first exhorted our progenitors to love one another, to have compassion for our fellow human beings and to live in appreciation of life’s gifts. Yet today we find that sustained positive emotions are not as prevalent in most people’s lives as we might expect. Such states, along with their numerous benefits, remain, for the most part, transient experiences in people’s lives, occurring randomly, and depend-

**FEATURE ARTICLE**

**Psychophysiological Correlates of Spiritual Experience**

*Doc Childre and Rollin McCraty, PhD, Boulder Creek, California*

*Abstract: Heartfelt positive emotions, such as love, appreciation, care and compassion, have long been associated with spiritual experience. However, because of a fundamental lack of mental and emotional self-management, such emotions, and associated experiences of increased spiritual connectedness, remain largely transient and unpredictable events in most people’s lives. Here, we summarize our research that has linked sustained positive emotion to a distinct mode of physiological functioning, termed psychophysiological coherence. This mode, characterized by heart rhythm coherence, increased heart-brain synchronization and entrainment of diverse physiological oscillatory systems, is associated with increased emotional stability, improved cognitive performance, and a range of positive health-related outcomes. Additionally, individuals frequently report feelings of increased spiritual connectedness during psychophysiological coherent states. Using heart rhythm coherence feedback training, individuals can readily learn to self-generate the coherent mode and sustain genuine positive emotional states at will, thus establishing an internal environment that is conducive to fostering spiritual experience.*

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It is now thousands of years since the earliest spiritual teachers first exhorted our progenitors to love one another, to have compassion for our fellow human beings and to live in appreciation of life’s gifts. Yet today we find that sustained positive emotions are not as prevalent in most people’s lives as we might expect. Such states, along with their numerous benefits, remain, for the most part, transient experiences in people’s lives, occurring randomly, and depend-
Emotional Management: The Missing Link

While most people intuitively know that they feel best and operate more efficiently and effectively when experiencing positive emotions, why is it that we do not more consistently engage such states in our day-to-day lives? Why do spiritual experiences remain rare and unpredictable occurrences for most people, even if many would desire to increase time spent in these fulfilling and regenerative states? We propose that a main factor underlying this discrepancy is a fundamental lack of mental and emotional self-management skills. In essence, the “inner noise” generated from unmanaged mental and emotional processes prevents people from more consistently engaging genuine positive emotions and sustaining states of enhanced spiritual connectivity. Despite our best intentions, the human “negativity bias” – the natural tendency to focus on input (including thoughts and emotions) perceived as negative to a greater extent than neutral or positive stimuli – is a very real phenomenon with a sound neurophysiological basis (Ito et al., 1998). Although most people would definitively claim that of course they love, they care, they appreciate, it might shock people to realize the large degree to which these feelings are merely assumed or acknowledged cognitively, far more than they are actively and intentionally experienced in the feeling domain. In the absence of conscious efforts to engage, build and sustain positive perceptions and emotions, we all too automatically fall prey to emotions and attitudes such as irritation, anxiety, worry, judgmentalness, being-overwhelmed, self-doubt and blame. Because of a lack of emotional awareness, many people actually do not realize the extent to which these negative emotional patterns (sometimes subtle and other times less so) dominate their internal landscape, eventually becoming so familiar and engrained that it may be difficult to separate them from one’s sense of self-identity.

Unmanaged mental, and particularly emotional, activity drains vital energy from our reserves, which we call the emotional energy accumulators, and creates disorder or incoherence in our bodily systems. These emotional energy drains and the disordered patterns of neural and hormonal feedback to the brain, in turn, reinforce the negative feeling while also compromising higher processes necessary for clear perception, rational thought, intuition and effective self-regulation (McCraty, in press). Without conscious intervention, we are often left with an internal environment that inhibits and limits the range of positive experience, awareness and deeper spiritual connection. Moreover, although various stress management practices exist whereby people attempt to manage their emotions and reduce emotional drains using the mind, strategies that engage cognitive processes alone are often insufficient to overcome engrained emotional patterns and produce enduring change in the feeling world. This is true, in part, because emotional processes operate at a much higher speed than thoughts, and frequently bypass the mind’s linear reasoning process entirely (LeDoux, 1996).

The Heart’s Role in the Generation of Emotional Experience

Our research has focused on the development of practical tools and techniques to facilitate the self-regulation of emotions through the direct modulation of emotional experience, utilizing the heart as a point of entry into the psychophysiological networks that comprise the emotional system (Childre & Martin, 1999; Watkins & Childre, in press). We have found that heart-focused approaches are often effective in helping people override and transform maladaptive emotional patterns and establish new, healthier positive emotional patterns and responses. Notably, one of the strongest common threads uniting the views of diverse cultures, religious and spiritual traditions throughout human history has been a universal regard for the heart as a point of spiritual influx, a source of wisdom and of positive emotions such as love, care and compassion. Current research providing evidence of the heart’s key role in the generation of perceptual and emotional experience suggests that these long-surviving associations may indeed be more than metaphorical. The heart is now recognized as a sensory organ and sophisticated information encoding and processing center, with an extensive intrinsic nervous system capable of making functional decisions independent of the brain (Armour & Ardell, 1994). Moreover, numerous experiments have demonstrated that patterns of cardiac afferent neurological input to the brain not only affect autonomic regulatory centers, but also influence higher brain centers involved in perception and emotional processing (Frysoinger & Harper, 1990; McCraty, in press; Sandman et al., 1982).

The analysis of heart rate variability (HRV), or heart rhythms, is a powerful, non-invasive measure of neurocardiac function that reflects heart-brain interactions and autonomic nervous system dynamics, which are particularly sensitive to changes in emotional state (McCraty, Atkinson & Tiller, 1993; McCraty et al., 1995; McCraty & Singer, in press; Tiller, McCraty & Atkinson, 1996). Our research suggests a critical link between emotions, changes in the patterns of both efferent (descending) and afferent (ascending) autonomic activity, and associated changes in heart rhythm patterns. Specifically, we have found that during the experience of negative emotions such as anger, frustration or anxiety, heart rhythms become more erratic or disordered, indicating less synchronization in the reciprocal action that ensues between the parasympathetic and sympathetic branches of the autonomic nervous system. In contrast, sustained positive emotions, such as appreciation, love or compassion, are associated with a highly ordered or coherent pattern in the heart rhythms, reflecting greater synchronization between the two branches of the autonomic nervous system, and a shift in autonomic balance toward increased parasympathetic activity (McCraty, Atkinson & Tiller, 1993; McCraty et al., 1995; Tiller, McCraty & Atkinson, 1996).

Our research has led us to propose a model of emotion that includes the heart, together with the brain, nervous and hormonal systems, as fundamental components of the dynamic, interactive network that underlies emotional experience (McCraty,
that combine intentional heart focus with the generation of sustained positive affective states lead to a distinct mode of physiological function, termed physiological coherence. This mode is associated with improved cognitive, emotional, performance and health-related outcomes, as well as with subjective reports of increased spiritual experience (McCraty & Atkinson, in press). Correlates of physiological coherence include a sine wave-like pattern in the heart rhythms, a shift in autonomic balance toward increased parasympathetic activity, increased ECG-alpha rhythm synchronization, and entrainment between diverse physiological oscillatory systems (i.e., heart rhythm patterns, respiratory rhythms and blood pressure oscillations). In the coherent mode, the HRV power spectrum reveals a narrow-band, high-amplitude peak in the low frequency range, at a frequency of about 0.1 Hz (McCraty & Atkinson, in press; Tiller, McCraty & Atkinson, 1996) (Figure 1).

Although physiological coherence is a natural state that can occur spontaneously during positive emotional experiences and sleep, sustained episodes are generally rare. While specific rhythmic breathing methods can induce coherence and entrainment for brief periods, our research indicates that individuals can produce extended periods of physiological coherence by actively generating a sustained positive emotion. Using positive emotion to drive the coherent mode allows it to emerge naturally and typically makes it easier to sustain positive emotions and physiological coherence for longer periods, even during challenging situations. Our research supports the concept that during positive emotional states, the change in the pattern of cardiac afferent input reaching the higher brain centers leads to cortical facilitation, whereby mental clarity, creativity and intuition increases.

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**Psychophysiological Coherence: Internal Correlates of Spiritual Experience**

Our research has shown that techniques that combine intentional heart focus with the generation of sustained positive affective states lead to a distinct mode of physiological function, termed physiological coherence. This mode is associated with improved cognitive, emotional, performance and health-related outcomes, as well as with subjective reports of increased spiritual experience (McCraty & Atkinson, in press). Correlates of physiological coherence include a sine wave-like pattern in the heart rhythms, a shift in autonomic balance toward increased parasympathetic activity, increased ECG-alpha rhythm synchronization, and entrainment between diverse physiological oscillatory systems (i.e., heart rhythm patterns, respiratory rhythms and blood pressure oscillations). In the coherent mode, the HRV power spectrum reveals a narrow-band, high-amplitude peak in the low frequency range, at a frequency of about 0.1 Hz (McCraty & Atkinson, in press; Tiller, McCraty & Atkinson, 1996) (Figure 1).

Although physiological coherence is a natural state that can occur spontaneously during positive emotional experiences and sleep, sustained episodes are generally rare. While specific rhythmic breathing methods can induce coherence and entrainment for brief periods, our research indicates that individuals can produce extended periods of physiological coherence by actively generating a sustained positive emotion. Using positive emotion to drive the coherent mode allows it to emerge naturally and typically makes it easier to sustain positive emotions and physiological coherence for longer periods, even during challenging situations. Our research supports the concept that during positive emotional states, the change in the pattern of cardiac afferent input reaching the higher brain centers leads to cortical facilitation, whereby mental clarity, creativity and intuition increases.
ative insight are increased and the genuine positive emotional experience is further reinforced (McCraty & Atkinson, in press). When the physiological coherence mode is driven by a positive psychological state, we call it psychophysiological coherence.

During states of psychophysiological coherence, bodily systems function with a high degree of synchronization, efficiency and harmony. Psychologically, this mode is associated with improved cognitive performance, increased emotional stability, and enhanced psychosocial functioning and quality of life (Luskin & Thoresen, 1999; McCraty & Atkinson, in press; McCraty, Atkinson, & Lipsenthal, in preparation; McCraty et al., 1999a; McCraty et al., 1998). Studies conducted across diverse populations have associated the use of positive emotion self-induction methods that increase psychophysiological coherence with a range of favorable health-related outcomes, including reduced anxiety and depression, decreased physical symptoms of stress, enhanced immunity, reduced cortisol and increased DHEA (Barrios-Choplin et al., 1997; McCraty, 2001; McCraty et al., 1998; McCraty et al., 1999b; Rein et al., 1995). Additionally, improvements in clinical status have been demonstrated in various medical patient populations, including individuals with hypertension, diabetes, congestive heart failure and AIDS (Luskin et al., 2000; McCraty, Atkinson, & Lipsenthal, in preparation; McCraty, Atkinson, & Tomasino, in preparation; Rozman et al., 1996).

In addition to these objective findings, subjective reports from numerous individuals practiced in self-generating states of psychophysiological coherence indicate that this mode is associated with increased spiritual experience. Depending on an individual’s particular belief system, this may manifest as a feeling of greater connectedness to God, unity with others, or greater connection to one’s intuitive intelligence, spirit, or higher self. Some describe experiencing a notable reduction in inner dialogue along with deep feelings of self-security, peace and love. Individuals who have learned techniques to generate the coherent mode with consistency in their daily lives frequently report greater physical vitality, clearer thought processes, greater creativity and intuitive insight, increased emotional balance and the capacity to meet even challenging situations with ease and grace.

Promoting Psychophysiological Coherence and Spiritual Experience Using Heart Rhythm Feedback Training

Heart rhythm feedback training is a powerful tool to help people learn to self-generate the coherent mode at will and develop emotional self-regulation skills that increase the capacity to sustain heartfelt positive emotional states and experiences of greater spiritual connectedness. Technologies have been developed which enable physiological coherence to be objectively monitored and quantified. One such device, known as the Freeze-Framer™ Emotional Management Enhancer, is an interactive hardware/software system that monitors and displays clients’ heart rate variability patterns in real time as they practice the positive emotional refocusing techniques taught in the on-line menus and books included with the system. These techniques guide people in intentionally generating sustained heart-based positive emotional states and coherent heart rhythm patterns. Using a finger sensor to record the pulse wave, the Freeze-Framer plots changes in heart rate on a beat-to-beat basis. As clients practice the emotional self-regulation techniques, they can readily see and experience the changes in their heart rhythm patterns, which generally become less irregular, smoother and sine wave-like as they enter the coherent mode. The program also analyzes the heart rhythm patterns and calculates a coherence ratio for each session. The coherence level is fed back to the user as an accumulated score or success in playing one of three on-screen games designed to reinforce the use of the self-regulation skills.

This technology has been successfully used in diverse settings by mental health professionals, physicians, educators and corporate executives to decrease stress, anxiety, depression and fatigue, promote improved academic and work performance, lower blood pressure and facilitate health improvements in numerous clinical disorders (McCraty, 2001). Additionally, many of our clients report that using this system has enabled them to develop the capacity to intentionally self-orchestrate benefits such as increased energy, self-directed thought, emotional stability and intuitive discernment, independent of external circumstances and events. They report that this learned ability greatly reduces the amount of stress they experience, increases personal effectiveness, improves relationships with others, and enables them to experience greater fulfillment in their day-to-day lives.

One of the most exciting implications of our findings is that by facilitating sustained states of coherence, this intervention appears to build back energy in cases where an individual’s emotional energy accumulators were depleted. This is particularly important, as we propose that the depletion of emotional energy plays a major and largely unrecognized role in both the genesis and aggravation of many psychological and health problems. Our findings suggest that training individuals to maintain psychophysiological coherence not only replenishes the energy needed to fuel basic, health-sustaining physiological processes, but also actually permits the accumulation of additional energy to support higher creative capacities, thus enabling individuals to actualize more of their full potential and enrich the quality of their experience.

Our work using heart rhythm coherence feedback training with diverse populations suggests that the effectiveness of this approach in producing enduring change stems from the fact that it not only helps individuals increase psychophysiological coherence in the moment, but also enables them to effectively build and establish a new internal baseline, where such states of enhanced functioning increasingly become the norm. Practices that enable individuals to self-generate increased heart rhythm coherence with consistency strengthen the neural circuitry and reinforce the bodily responses activated during this state of enhanced mental, emotional and physiological functioning. Furthermore, the coupling of a positive physiological shift with an intentional positive emotional shift creates a powerful conditioned response – subsequently enabling coherent heart rhythm patterns to facilitate positive emotional
experiences, and positive feeling states to further enhance physiological coherence.

According to the model of emotion proposed here, with repetition, this process effectively establishes a new, stable reference pattern that is recognized by the brain, thus re-training the system to operate at a new, healthier baseline or norm. Ambulatory ECG data shows that this "re-patterning" process does indeed occur. Individuals well-practiced in self-management techniques are able to increase psychophysiological coherence, and enter this mode spontaneously during their day-to-day activities, without conscious application of the techniques.

In conclusion, we believe that heart rhythm coherence training holds promise as a practical and potent approach to empower individuals to improve the quality of their lives. By enabling the intentional self-generation and reinforcement of physiological states that are correlated with increased love, care, compassion, inner harmony, vitality and flow, in essence this intervention helps individuals create an internal environment that is conducive to fostering spiritual experience. Some might indeed describe the end result as being able to live more "from the heart," in alignment with their deepest core values, or with greater connection to spirit.

References


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Ambulatory Psychophysiology and Ecological Validity in Studies of Sports Performance: Issues and Implications for Intervention Protocols in Biofeedback

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Abstract: The heart activity of an elite tennis player was monitored over the course of two complete official tournament tennis matches to determine whether trends in heart rate deceleration observed in the laboratory and in more static sports would occur in an action sport. Consistent with previous research heart rate deceleration was evident prior to action phases of both matches. Greater magnitudes of heart rate deceleration also occurred in a match that was won compared to one that was lost. This study differed from previous ones in that heart activity was analyzed in the context of a realistic and more ecologically valid situation (entire real matches) and a meaningful longitudinal dependent measure of performance (match outcome).

Since heart rate deceleration has been associated with attention, cognitive activity, and physiological reactivity, the author proposes that heart activity may be the measure of choice for assessing psychological and behavioral states in athletes and other performers (e.g., pilots, musicians, public speakers) where it is imperative that research findings and interventions have a high degree of ecological validity (i.e., the data must be procured from and reflect conditions encountered in context specific situations; Fahrenberg & Myrtek, 1996).

Ambulatory Psychophysiology

Ambulatory psychophysiology is the study and assessment of behavioral and physiological interactions in naturalistic settings (field research; Fahrenberg, 1996). Its methodology involves the continuous physiological monitoring (i.e., ambulatory monitoring) and observation of free-moving individuals in everyday life situations (Fahrenberg, 1996). Its application may be particularly important to the study of athletes and other performers (e.g., pilots, musicians, public speakers) where it is imperative that research findings and interventions have a high degree of ecological validity (i.e., the data must be procured from and reflect conditions encountered in context specific situations; Fahrenberg & Myrtek, 1996).

Although the value of ambulatory psychophysiological assessment has been recognized by sport and performance psychologists and coaches, it is a relatively unexplored and underused procedure despite the fact that many of the central constructs of sport and performance psychology including intensity are psychophysiological in nature (Heil & Henschen, 1996; Taylor, 1996). For example, primary theoretical lines that elucidate the concept of intensity (reactivity) all have major physiological and psychophysiological components including Yerkes and Dodson’s (1908) Inverted-U, Hanin’s (1980) Zone of Optimal Functioning (ZOF), and Hardy and Fazey’s (1987) Catastrophe theories.

Unfortunately, these and numerous other concepts and interventions in sport and performance psychology have not been sufficiently researched especially at the intra-individual level and temporally. Essentially, little is known about the underlying psychophysiology these theories allude to or bodily changes mental training methods supposedly induce. Taylor’s (1996) view of intensity (reactivity/activation), which he refers to as: the most critical factor prior to competitive performance because, no matter how confident, motivated, or technically or physically prepared athletes are to perform, they will simply not be able to perform their best if their bodies are not at an optimal level of intensity, accompanied by the requisite physiological and psychological changes... (p. 75) illustrates the imprecise manner in which physiology and interventions in sport and performance psychology are often discussed. In analyzing Taylor’s perspective on intensity, one still must ask, what do “confident” and “motivated” mean? Also, what is an “optimal level of intensity,” and what are “requisite physiological” and psychological changes” that accompany intensity?

Similarly, how do sport psychology practitioners know they are really entraining “heightened attention” or manipulating reactivity (intensity) when using biofeedback since these psychophysiological states have yet to be adequately delineated or operationalized during real sport competition or unequivocally associated with potent outcome measures (i.e., dependent or criterion variables). Without studying the components and effects of physiological and psychophysiological processes on “real life” performance assumptions about intensity or states of activation and the effects of...
interventions on athletes remain speculative. In my Master's thesis (Carlstedt, 1998) I wanted to address some of the above issues and the concept of ecological validity by investigating sport performance in the context of an entire "official" competition (in contrast to doing so in a contrived or practice situation), to better delineate psychophysiological parameters and performance relationships in a realistic setting. My ultimate goal was to establish and/or describe psychophysiological and performance relationships having a higher degree of ecological validity than observed in previous research in sport, including that demonstrated by most neurofeedback intervention protocols and research paradigms used in sport today. Doing so is a necessary (but often overlooked) first step in validating and determining the reliability of interventions in sport and performance psychology.

Heart Rate Deceleration Revisited: An Ideal Measure of Psychological Performance

To pursue this goal I settled on heart activity during tennis tournament competition as the focus of a preliminary study, a surprisingly sparsely used measure considering the large body of evidence associating specific parameters of heart activity with psychological factors thought important to sport performance, and since it is probably the only physiological measure that can be obtained relatively non-invasively during the course of an entire real sport competition.

In addition to reflecting emotions and other psychological states (e.g., motivation, intensity), heart activity has been found to be an important measure of attention and cognitive activity (Sandman, Walker & Berka, 1982), factors that are thought to affect sport performance (Carlstedt, 1998, 2001). In reviewing the literature, Sandman, et al. (1982) concluded that HR and blood pressure (BP) differentiated cognitive-perceptual processes better than EEG. Galin (1974) also suggested that heart activity is more useful than EEG for analyzing attentional processes, because EEG only represents activity at the dorsal convexity of the brain but does not reflect activity in deep medial brain areas such as the hippocampus and the amygdala. Pribram and McGuiness (1975) have shown that the hippocampus and amygdala play an important role in attentional processes.

Experimental evidence also indicates significant interactions between the cardiovascular, the central nervous, and the somatic systems (Andreassi, 1995). One line of research has established relationships between cardiac activity and reaction time (RT), with Lacey and Lacey (1964) reporting decreased heart rate (i.e., heart rate deceleration; HRD) during the fixed foreperiod of simple RT experiments. It has also been shown that greater magnitude of heart rate (HR) slowing is related to faster RTs (Lacey, 1967). It has been suggested that HRD represents a preparation to respond when an individual expects a significant stimulus (Andreassi, 1995). Fast reactions are also associated with peak sport performance (Carlstedt, 1995).

Investigations in sport have also documented HRD. In a comparison of elite and beginning golfers during putting, Boucher and Zinsser (1990) reported more HRD in better golfers. In another study, Hatfield, Landers, and Ray (1984) reported elite rifle shooters exhibited HRD prior to shooting, providing evidence in support of previous electrophysiological and neurocardiologic explanations of psychologically mediated HRD (e.g., Lacey & Lacey, 1978; Sandman et al. 1982). For example, it was found that increased right hemispheric EEG activity was a concomitant of HRD prior to shoot-

1 Although neurofeedback is rapidly becoming the modality of choice in attempting to entrain attention, the invasive nature and artifact proneness of EEG makes it difficult to use reliably during action sports. By invasive I mean EEG equipment and monitoring procedures today limit and disrupt an athlete's movement during competition. By contrast, Holter and HR telemetry equipment and the Polar system (used in this study) can be worn with minimal discomfort and virtually no constraints on movement throughout the course of an action sport. Moreover, most data derived from EEG/neurofeedback studies emanate from laboratory or contrived paradigms, with no studies having demonstrated supposed ideal EEG activity (ideal states of attention) during real competition, calling into question the ecological validity of many current neurofeedback protocols and EEG research paradigms.
heart period. Shorter IBIs indicate an acceleration of the heart or a shorter and faster post-action recovery phase. Longer IBIs indicate a slowing of the heart. After action ceases the IBIs again become longer in the response IBI. Thereafter the IBIs become progressively shorter during the action phase. Match 1. Notice that the IBIs become progressively longer leading up to action in Match 1 compared to Match 3. Figure 1. Sample selection of pre-action, action, and post-action IBIs in tennis matches. More importantly, the general hypothesis of the study, which predicted more HRD prior to action phases in a match that was won compared to a match that was lost, was confirmed. Although both matches were marked by progressive HRD leading up to action, Match 1 showed greater HRD in all configurations of IBIs prior to action. A particularly noteworthy finding was that the last IBI prior to action was longer compared to the next to last IBI in Match 1 than Match 3. This finding is consistent with studies by Lacey & Lacey (1978) and Jennings & Woods (1977), which reported the greatest amount of HRD in the last IBI prior to the presentation of a stimulus (e.g., the serve in tennis).

The following IBI combinations were also examined to determine if greater magnitude of HRD would be evident in a match that was won compared to a match that was lost: 1) the difference in the rate of HRD between all IBIs prior to action in Match 1 compared to Match 3; and 2) the difference in the rate of HRD between all IBIs prior to action in Match 1 and Match 3.

Findings included: 1) total IBIs prior to action in Match 1 compared to Match 3 revealed more pre-action HRD in Match 1 than in Match 3.

Match 1
I_________________________I

Match 3
R...........5.42 msec....R...........8.67 msec......R
I_________________________I

Figure 2. Mean rate of heart rate deceleration for all IBIs prior to action in Match 1 compared to Match 3 (p = .045).

Discussion
The results of my study showed that HRD preceded action phases during both tennis matches. More importantly, the general hypothesis of the study, which predicted more HRD prior to action phases in a match that was won compared to a match that was lost, was confirmed. Although both matches were marked by progressive HRD leading up to action, Match 1 showed greater HRD in all configurations of IBIs prior to action. A particularly noteworthy finding was that the last IBI prior to action was longer compared to the next to last IBI in Match 1 than in Match 3.

Match 1
I_______________________I

Match 3
R...........5.42 msec....R...........8.67 msec......R
I_________________________I

Figure 3. Mean difference in heart rate deceleration between the last IBI prior to action compared to the next-to-last IBI in Match 1 (p < .008) and mean difference of the rate of heart rate deceleration between the last IBI prior to action compared to the next-to-last IBI in Match 3 (p < .079).

The results of my study become more meaningful when considering the diametrically opposite performance and outcome of the two matches. These extreme differences are reflected in quantitative performance data (e.g., match score and statistics) and qualitative impressions of the match (i.e., psychological performance). In addition, the player’s self-report indicated major differences in attention, emotions, self-confidence, cognitive activity, and reactivity between matches, feedback that was consistent with HRD trends and in line with theoretical and hypothetical explanations of what HRD is thought to reflect (increased attention and reduced cognitive activity, and reactivity).
attention, reactivity, and cognitive activity during real competition.

Implications and Issues

Since the ability to use of EEG and other physiological measures in studying athletes in realistic situations is quite limited, researchers and practitioners should consider using heart activity to describe and assess psychological and behavioral states and the efficacy of interventions to manipulate these states during competition. In addition to generating unique information on attention, cognition, and reactivity, heart activity could be used to validate concurrently theories and hypotheses in neurofeedback that have yet to be substantiated. For example, after a neurofeedback session an athlete's heart activity could be monitored during actual competition to determine whether behavior or responding that has supposedly been entrained through neurofeedback corresponds with an empirically demonstrated measure of attention, cognitive activity, and reactivity; namely, heart rate deceleration. As previously mentioned, Hatfield et al.'s (1984) study suggests this should be possible.

If entrainment has been successful one would expect HRD trends to reflect such. Rather than relying on self-report and weak dependent outcome or performance measures, practitioners and researchers should actively attempt to validate many of the claims associated with neurofeedback (in sport) in the context of a new and more ecologically valid paradigm, using a concurrent physiological measure (heart activity) known to reflect those psychological states neurofeedback attempts to manipulate to enhance the performance of athletes.

The reliability and credibility of biofeedback protocols ultimately depends on the ecological validity of the data used to conceive of methods such as neurofeedback in sport. Researchers, practitioners, coaches and athletes must be certain target levels of activity being entrained (e.g., specific levels of EEG activity) indeed occur during temporally isolated moments of competition (e.g., prior to a critical moment like a break-point in tennis or crucial putt in golf). Not only should specifically entrained physiological activity be apparent during important competitive moments, it also must be associated with improved performance when manifested (i.e., a specific range of EEG activity must be associated with a meaningful dependent measure of better performance such as sinking a crucial putt in golf).

I predict that the future of biofeedback and neurofeedback in sport and performance psychology will depend on our ability to accurately delineate psychophysiological activity during real competition and thereby discern whether attempts to entrain specific responding indeed has an effect on sport performance. To date our best hope for achieving this may lie with heart activity. Heart activity is a physiological measure that is backed by a significant body of empirical research that has isolated parameters of ideal responding that appear to reflect attention, cognitive activity, and reactivity, during real sport competition, something that has not been evidenced using other physiological systems and modalities including neurofeedback.

Although using heart activity requires much work in the initial phases of research and practice it is probably the only measure allowing for the continuous physiological monitoring of athletes in real competition and should be considered by all practitioners in sport psychophysiology and biofeedback as an alternative or adjunct to EEG and other modalities that are restricted in their scope of usage.

Limitations and Future Directions

These preliminary findings were consistent with previous research of HRD in the laboratory and static sports. Future studies should attempt to replicate these results on a larger scale and in a variety of action sports in hopes of unequivocally establishing HRD as an important component of the performance equation and heart activity as an ideal psychophysiological measure of various performance parameters during real sport competition.

References


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This article is based in part on my Master’s thesis at Saybrook Graduate School in San Francisco. Special thanks go out to my Master’s thesis chair Dr. Eugene Taylor of Saybrook and Harvard Medical School and committee member Dr. Arne Collen of Saybrook. Correspondence: via www.americanboardofsportpsychology.org or DrRCarlstedt@aol.com.

Example, the Daubert Rule of Evidence, which superseded a few years ago the Frye Rule of Evidence. The old (Frye) rule of evidence allowed any person with presumable expertise on a technical subject to testify as expert based on the background of the individual and the logic of the testimony. The new (Daubert) rule of evidence excludes expert testimony from individuals with the appropriate background on any technical evidence, unless the technology/methodology under testimony satisfies a number of legally established criteria. In summary, these criteria include the accuracy of the equipment and statistical factors regarding the results. These statistical parameters include at a minimum the following: average, standard deviation, coefficient of variation, standard error, confidence interval and a documentation of reliability in terms of a data base for the modality concerned.

Furthermore such testimony depends on peer-reviewed documentation, the training and experience of the individual expert, as well as documentation of the acceptability of the individual expert in terms of peer reviewed publications and presentations.

Those biofeedback practitioners who rely only on qualitative work and past qualitative writings may become esteemed pillars in the history of the subject. Those practitioners, who learn to rely on quantitative signal analysis and quantitative interpretation of the biofeedback modalities, will move the field forward and bring it into the limelight it deserves.

AAPB should now assemble relevant historical information on the subject of biofeedback, and create the conditions necessary for further progress in our field, including greater standardization in training, the development of normative data bases for diagnostic assessment, and the promotion of standardized, well-documented treatment protocols.

**To Standardize or Not to Standardize** continued from Page 10

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Some Reflections on Learning Theory, Surface Electromyography and Motor Learning

Jeffrey E. Bolek, PhD, Cleveland, Ohio

Abstract: Surface electromyography does not have a good record of accomplishment as far as generating innovative approaches in the medical community. Part of the problem might be the lack of a good theoretical foundation before a treatment plan is developed. This article presents a novel way of conceptualizing sEMG data so as to provide help in the determination of effective function for a patient. A treatment plan is then analyzed within an operant learning paradigm, forcing the clinician to analyze scientifically what one is doing to avoid errors in treatment.

Training Objectives in sEMG Biofeedback

Krebs (1995) observed that requesting a patient to reach a criterion level of sEMG activity is the most frequent approach used when using sEMG as a tool in rehabilitation (motor planning). However, what exactly is this sEMG reading telling us? Is the increased reading due to increased recruitment of the target muscle, is the target muscle reading higher due to “guarding” a weaker muscle on the contralateral side or is a neighboring muscle’s activity being picked up by the electrodes?

A related question is how can “good” or “acceptable” posture, gait, etc. be defined? Scrutton & Rosenbaum (1997) distinguish between making a judgment about how near a movement is to normality vs. how near it is to that child’s likely most effective function. In their example, encouraging a young child with spastic diplegia to walk with a 20° hip and knee flexion, while allowing independence and more socially appropriate interaction with peers can, over time, lead to fixed hip flexion deformity. So how can one best check to make sure that our sense of “effective function” for a given patient is on target?

Three questions that face every clinician doing this work are: 1) How do we know when doing motor planning training what a positive/negative change in microvolts means? 2) How do we know what “good” standing, sitting, etc. is? and 3) Once established, how can the skill be encouraged?

An Operant Conditioning Paradigm

The following paragraphs summarize an alternative approach to conceptualizing or transforming sEMG data, and to reframing the motor learning that occurs within an operant conditioning paradigm. The setting is the Motor Control Program at the Cleveland Clinic Children’s Hospital for Rehabilitation (CCCHR). The Motor Control Program conducts motor re-education with children, mostly with a diagnosis of cerebral palsy, with the goal of facilitating the accomplishment of therapy goals in children with behavior problems, motor planning deficits, and developmental delay. Many of these children also either are difficult to engage therapeutically, due to past medical procedures, or are very young children.

Case Study: A Child with Cerebral Palsy

A 10-year-old child with cerebral palsy is working on endurance in standing with normal posture. For this child, bilateral quadriceps and hamstrings are monitored. The threshold is set so that if the quadriceps are kept above a set level while the hamstrings are kept below, a reward is immediately activated (a favorite video). The particulars of this system are summarized in earlier works (Bolek, Mansour-Moeller, & Sabet, 2001). At times a child looks to be standing correctly but is actually, as one therapist puts it, “hanging on his hip flexors,” the overuse of which is common in cerebral palsy. This may be determined by palpating the target muscles, but having sEMG to support our hunches makes for more effective decision-making. This is a simplified summary but sufficient for the purposes of this paper. The reward contingency is summarized in table 1:

<table>
<thead>
<tr>
<th></th>
<th>Hamstrings above t</th>
<th>Hamstrings below t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quadriceps</td>
<td>No reward</td>
<td>Reward</td>
</tr>
<tr>
<td>above t</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quadriceps</td>
<td>No reward</td>
<td>No reward</td>
</tr>
<tr>
<td>below t</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1

The following steps summarize the program:
1. Define effective function for this child and for this exercise.
2. Attach electrodes to the target muscles and set the threshold.
3. Define the sampling interval to be used. For most motor control work, samples greater than 1/10 second are rarely needed.
4. Set the equipment thresholds so that effective function is rewarded.
5. Tabulate the amount of time the reward was active as a percentage of the total time monitored.

Rather than using the sEMG value per se, a transformed score is generated that is used to interpret progress both within and
across treatment sessions. The child’s recruitment level as measured in microvolts (rms) is transformed into a Motor Control score. The transformation is a dichotomy, either it is there or it is not. “It” refers to acceptable posture, gait, sitting, tall kneeling, half-kneeling, standing or whatever the child is working on in therapy. Further, it is either there/not there for a discrete amount of time. If the child has met the thresholds at that instant in time, he/she gets a “credit” for that time sample. Every sample is tabulated during the session. Theoretically, the top score can be 100%. The time sample interval varies according to the task. One would not want a yearly work performance review based on once-a-week five-second random observations. Nor would selecting a random, consecutive eight-hour observation over the course of a year produce an accurate snapshot of job performance. “Effective function” is thus defined as the apparent quality of the stance/movement/gait plus evidence from the sEMG that we are, in fact, raising certain thresholds while lowering others based on knowledge of anatomy and kinesiology. This avoids the problems mentioned earlier when dealing with sEMG microvolts and incorporates the element of effective function into the treatment. For PC based systems, very accurate data collection can be achieved and the results plotted with time of session on the abscissa and percent of time “on” on the ordinate. Additional analyses can be made such as the longest consecutive time “on” and the pattern of consecutive times “on.”

**Operant Learning Principles**

One can express this in operant conditioning by a review of the following terms:

1. **Positive reinforcer:** increases a behavior by presenting a reward following the behavior.
2. **Negative reinforcer:** increases a behavior by terminating an unpleasant event after the behavior.
3. **Positive punisher:** decreases a behavior by presenting an unpleasant event following the behavior.
4. **Negative punisher:** decreases a behavior by the termination of a pleasant event following the behavior.

When applied to a fictitious case where a child is rewarded by activation of a movie and punished by a loud tone, we have:

1. Positive Reinforcer: meeting the criterion thresholds results in the movie appearing on the screen.
2. Negative Reinforcer: meeting the criterion thresholds results in the termination of the tone.
3. Positive Punisher: not meeting the criterion thresholds results in activation of the tone.
4. Negative Punisher: allowing the thresholds to drop, once the movie is activated, results in the termination of the movie.

(In actuality, the negative reinforcer and positive punisher are never used in real situations; they are included to balance the model).

How can these learning theory principles be applied to this model? Failure occurs in one of two ways: the lack of use of the target muscles or the activation of the muscles to be kept below threshold. Notice all reinforcers increase behaviors while all punishers decrease behaviors. Both reinforcers and punishers can be “positive” or “negative”. Notice that for the positive classes (positive reinforcer or positive punisher), the action element is not continuous, it is “presented” to the subject. The child either receives a reward or a punisher. Notice that for the negative classes “termination” is the key action taking place, or the termination of an event already ongoing. The child’s event, be it pleasant or unpleasant, is terminated. Both the positive reinforcer and negative punisher (the two behavior modification strategies used in this program) have, as their focus, the manipulation of a pleasant event, either trying to get it or trying to keep it.

Common themes based on positive/negative reinforcers/punishers:

<table>
<thead>
<tr>
<th>Positive reinforcer</th>
<th>Negative reinforcer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative punisher</td>
<td>Reward or movie centered</td>
</tr>
<tr>
<td>Positive punisher</td>
<td>Activating something</td>
</tr>
</tbody>
</table>

The common theme in both positive reinforcers and negative punishers is that they are both reward or “movie” centered, whereas negative reinforcers and positive punishers are both punishment or “tone” centered.

A treatment starts by the child discovering how to use the target muscles to activate his/her reward. The first time this happens, the reward acts as a positive reinforcer. The child uses the correct constellation of motor recruitment patterns and is rewarded for doing so. Once the movement is learned, however, the learning paradigm shifts more to a negative punisher. This is because once the behavior required is learned the focus is on keeping the video on (i.e., not causing the termination of a pleasant event). There is evidence from studies with humans that both positive reinforcement and negative punishment are equally effective in modifying behavior (Iwata & Bailey, 1974; Schwartz, 1978). Research has shown that learning is enhanced when positive reinforcement rather than negative reinforcement is used (Lalli, Vollmer, Progar, Wright, Borrero, Daniel, Barthold, Tocco, & May, 1999).

From an operant conditioning perspective this approach could be summarized as follows:

<table>
<thead>
<tr>
<th>Unpleasant event</th>
<th>Pleasant event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cause to terminate</td>
<td>Negative reinforcer “absence of” increases behavior</td>
</tr>
<tr>
<td>Cause to happen</td>
<td>Positive punisher “presence of” decreases behavior</td>
</tr>
</tbody>
</table>

Table 3

Or more precisely:

<table>
<thead>
<tr>
<th>Positive reinforcer</th>
<th>Negative reinforcer</th>
</tr>
</thead>
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<tr>
<td>Negative punisher</td>
<td>Reward or movie centered</td>
</tr>
<tr>
<td>Positive punisher</td>
<td>Activating something</td>
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</table>

Table 2
inappropriate behavior.

The paradigm has its own beginning and end as a natural result of the feeding process. For example, a four-year-old child sustained a brain injury and subsequent hemiparesis. She was brought to the Motor Control Program because slow progress had been made in helping her to learn to reach forward with her right arm without excessive shoulder abduction and upper trapezius use. She would essentially circumduct her whole right shoulder to make the movement. We were able to help her learn the movement in 12 weeks. One essential part of the treatment was to program the activation of her reward for a set period of time, 5 seconds. So the protocol in action was: reach correctly, get a reward, return to resting position, reach incorrectly, no reward, return to rest, etc. Both these examples have a critical element in common: They contain mixed (a.k.a., random, distributed) rather than blocked practice.

In blocked practice, a skill is repeated over and over in a single block of time, whereas in mixed practice the skill is interwoven with other tasks. Research over the years has supported the finding that blocked practice increases performance while mixed practice enhances learning (Simon & Bjork, 2001). The “reaching” and “swallowing” programs mentioned above both allow for the interweaving of other activities in the treatment program, be it smacking lips or returning an arm to the resting position. Prior research (Magill, 1989) theorizes that learning is enhanced in mixed practice by the interference it provides thereby mimicking more accurately the real world. The solution is to offer many rest breaks during the session that allow the practiced motor plan to evaporate, be rediscovered, and so on. In massed practice, performance appears to improve but the ability to repeat the skill at a later time (as in the classic definition of learning, “relatively permanent changes in behavior”) is not there.

### Applying Operant Analysis to Training

The above distinctions are more than an academic exercise. Forcing oneself to analyze within a scientific framework what one is doing helps avoid errors in treatment. Consider this scenario: The child alluded to above is learning to stand and at some point becomes oppositional. The therapist decides to let the child fall slightly as a consequence of not standing. This has changed the paradigm from positive reinforcement and negative punishment to positive punishment simply by making what appears to be a small change. Whether this is the proper approach is not the topic here. The situation to be avoided is the application of a conditioning approach without full awareness on the part of the therapist as to the benefits and risks.

The sEMG allows for the acquisition of skill very early in the motor control chain. Muscle action potentials not nearly strong enough for visible movement are rewarded. A beginning telegrapher may rely on “letter habits” as he laboriously thinks about each letter as he presses the telegraph key. An intermediate telegrapher likely uses “word habits” as he groups the words at glance and sends them. In addition, an advanced telegrapher has graduated to “phrase habits” as he processes “chunks” of information. As one advances motorically, they are able to digest more information at a glance and process it both qualitatively and quantitatively differently. The countless corrections of muscle agonists/antagonists/synergists work in concert to produce the analogue of the telegraphers advancing from letter habits to word habits to phrase habits. At some point, the swaying back and forth and catching oneself before falling transforms into “standing.” Is standing with 30º trunk flexion really standing? What about 10º? It is admittedly a subjective term. Therefore, the analogue of letter habits might be standing while repeatedly grabbing hold of a support and the analogue of word habits might be not holding a support and not swaying. Phrase habits become translated into standing erect independently and conversing without worrying about standing.

This is the automaticity of a pianist playing a sonata. What happens when a virtuoso pianist decides to concentrate on an earlier, more basic skill (i.e., finger movements), that has long been replaced by playing a musical phrase? “The pianist takes in a whole musical phrase from the score at a glance; both input and output are no longer

<table>
<thead>
<tr>
<th>Cause to terminate</th>
<th>Unpleasant event</th>
<th>Pleasant event</th>
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</thead>
<tbody>
<tr>
<td>Have a 90-db tone stop as long as the criterion thresholds are met.</td>
<td>When the criterion drops below threshold, the movie disappears from the screen.</td>
<td>When the criterion is at or above threshold, the movie appears on the screen.</td>
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</table>

#### Table 4

The two contingencies not used for obvious reasons involve either the removal of an unpleasant event or the initiation of an unpleasant event. An example of the former would be terminating an unpleasant sound by reaching the criterion threshold; for the latter it would be the activation of an unpleasant sound whenever the threshold is not met.

The child in this paper was exposed to only positive reinforcers and negative punishers.

This program differs from typical operant paradigms. The work done is by the nature of the task continuous rather than discreet. In a typical operant paradigm, the pairing in time with a pleasant event rewards the behavior elicited. For example, if a child is being taught to feed correctly the protocol is: giving a small change. Whether this is the proper approach is not the topic here. The situation to be avoided is the application of a conditioning approach without full awareness on the part of the therapist as to the benefits and risks.

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measured in bits but in chunks” (Koestler, p. 511). By concentrating on his fingers a pianist can paralyze his movement. "We can make ourselves lose sight of a pattern of physiognomy by examining its several parts under sufficient magnification” (Polanyi, p. 18). Again, it depends on where the pianist is in the motor chain and what he is trying to accomplish.

**Applications to Pediatric Motor Control Training**

What does all this mean to the treatment of children brought to us for help in motor control? First, frame the learning model one is using beforehand so that the application/removal of the rewards/punishers are clear. Positive reinforcers and negative punishers are both equally effective in modifying behavior, while protocols focused on avoiding or fearing the occurrence of something unpleasant muddy the treatment with negative emotions. As much as possible construct the learning environment around a pleasant event by either having the child work to obtain it or work to keep it.

Secondly, when appropriate try to enhance learning by using distributed practice as a means of breaking up the motor chain so that what is practiced is the process of solving the problem again and again, not repeating the means to a solution of the motor problem. For example, covering the readout on the screen not only helps the patient to internalize the skill but also avoids allowing "letter habits" the opportunity to interfere with the developing of "word" and "phrase" habits. An analysis of where the child is at is critical. For one child a focus on isolated muscle contractions (muscle re-education) may be appropriate, while for another inhibiting unwanted patterns while facilitating normal movement may be best (facilitation model). For another a motor control approach may be best where general strategies rather than specific solutions are practiced. When in a rush, blocked practice often occurs by default. The mental challenge of helping a patient move from “letter” to “word” to “phrase” habits in treatment is one of the biggest and most exciting aspects of this kind of work.

**References**


The Impact of EEG Biofeedback Integrated with Open Focus and Safe Place Techniques on Aspiring Opera Singers: A Clinical Pilot Study

By Rae Tattenbaum, LCSW, West Hartford, Connecticut

Abstract: In the summer of 2001, Rae Tattenbaum worked with a newly formed institute known as Intermezzo to implement a pilot clinical trial to test her hypothesis that EEG Biofeedback integrated with Open Focus and Safe Place techniques might help aspiring opera singers. Despite setbacks and obstacles along the way, the study of 9 students undergoing training and 6 in a control group demonstrated that the techniques employed in the project made noticeable differences in the young singers’ performances.

The Peak Performance Program

Several years ago, spurred by my experience helping a young opera singer overcome panic attacks and prepare for college auditions, I developed a five-part program that includes biofeedback, primarily neurofeedback, for physiological balance, open focus exercises, inner journey work, mental rehearsal, and, finally, coaching. To date some 60 musicians, singers and athletes have participated in 5 or more of these sessions. This peak performance-training program has, according to case-based testimony, enhanced abilities and dissolved barriers to performance. It has provided participants with techniques and tools that address the mental and physiological issues that interfere with their success. This approach increases stress tolerance and decreases performance anxiety.

The program teaches the aspiring artist a set of techniques. Two critical ingredients for peak performance are attention and the ability to regulate one’s arousal level. This peak performance program focuses on the performing artist’s ability to manage physical, emotional, and cognitive states during learning and performance and to predictably and consistently enter “the state of flow.”

In the summer of 2001, I had an opportunity to test the effectiveness of my approach on a group of opera singers participating in the four-week Intermezzo program. I anticipated that every participant’s skill and vocal performance would improve after a four-week, intensive program. The question was this: What vocal changes might I identify in a group that was also doing a peak performance-training program?

The Intermezzo Program

The Intermezzo program brought together 48 aspiring young artists whose common goal was to develop their singing and performance skills. About 50 percent were undergraduate opera majors; 25 percent were enrolled in graduate opera programs, and the remaining 25 percent were young professionals. Their competence and skill levels varied widely:

Intermezzo participants paid a fee for the opportunity to continue studying with their current vocal teacher or another prominent voice teacher and to take advantage of such offerings as coaching, career discussions, and master classes. The first two weekends of the program offered many performance opportunities, and during the final two weekends six operas were rehearsed and performed by different casts.

Introduction of the Performance Coaching Program

During auditions and interviews, Intermezzo’s founder and director, Mitchell Piper, enthusiastically and supportively introduced the peak performance program as a development opportunity for the young artist. (This, despite the fact that he had not yet made a commitment to offering that program. Because of funding issues, that commitment was not made until the first week of June, just as Intermezzo got underway.) Participants were mailed a description of the peak performance program, which explained that the purpose was to assist in enhancing attention, regulating arousal, and eliminating barriers to performance.

Our goal was to have participants indicate their interest in participating before Intermezzo began, and in fact twelve people did so within a ten-day period. However, a number of participants had not received their packets prior to their arrival at Intermezzo. Still, following an initial 30-minute presentation at the start of Intermezzo, thirty people expressed interest in participating in the program.

How to Measure Improvement?

At Nancy Andersen’s suggestion, borne of her research with authorities in the voice therapy and medicine field, we designed a system that would include digital recordings of the participants’ voices before and after their participation in the program. (Andersen is a member of the voice faculty at The Hartt School). As the study continues, a panel of established voice teachers and singers will listen to selections from the recordings and rate the participants’ resonance, ease of production, and vocal elements. An acoustical evaluation in a voice...
Each person, whether in the control group or the performance training program, was asked to sing *a cappella* three phrases demonstrating the low, middle, and high ranges of his or her voice, scales on various vowel sounds, and an excerpt from his or her repertoire that represented emotional content.

Each person was also asked to complete a questionnaire that measured self-consciousness and to evaluate their last performance according to the Sandra Jackson “state of flow” scale.

Finally, each participant was interviewed for 15 minutes about his or her specific emotional and health issues. As a result of this interview, two people were counseled not to participate. Several others were identified as borderline and likely to drop out. (Three actually did drop after one to four sessions.)

**The Peak Performance Program**

Participants were encouraged to sign up for a minimum of 10 EEG training sessions, which were offered in two rooms equipped with EEG Biofeedback systems. Sessions were available anywhere from 25 to 40 hours per week during Intermezzo, and each participant took part in 10 to 13 sessions. Each participant was given a copy of a customized open focus tape written for vocalists. Each was asked to listen to this tape, which introduced the concept of creating a safe place for mental imagery and performance, daily, and especially before vocal lessons and performances. Participants reported using this tape consistently between four and seven times a week. In conjunction with the Biofeedback sessions, open focus techniques were used for dissolving sensations. The safe place concepts and guided visualization were used to dissolve barriers and develop mental imagery to accompany musical selections.

The control group participated in their regularly scheduled program without the use of tapes, or biofeedback.

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**Conclusions: What We Learned**

My involvement with the Intermezzo project remains a work in progress (which I hope to find funding to continue), but the initial results are encouraging. The immediate impact of the program was initially observed during the recitals and concerts performed over the course of the four-week program. Participants reported that those who had had a peak performance training session on the morning of the performance were more relaxed and present than usual.

One stage director (who had experienced her own peak performance training three years earlier and therefore knew what to listen for) observed the change in the sound produced by one of the leads, even though that singer had discontinued after the 9th session.

Eight peak performance participants finished all of the sessions and showed up for the final evaluation. (One other made an appointment but did not show up for her final recording.) Six control group members showed up for the final vocal evaluation. (Two made appointments and did not appear.)

The recording engineer and others who were present noticed that the control group members experienced vocal fatigue and were unable to sing as easily as the peak performance participants. To the ear, the control group also had less resonance.

Following the vocal evaluation recording each participant was interviewed on audiocassette (and some on video). The following are some of their comments:

- The program made them more attentive, and because they were more focused they were better able to handle the staging rehearsals and to learn the staging.
- Individual voice lessons and coaching sessions were more effective because the participants felt more focused, they were better able to listen to critiques, criticisms, and suggestions; suggestions from vocal teachers and coaches were more readily absorbed.
- In some instances, participants were able to make specific technique changes that they had been unable to accomplish before. A coach asked one of the

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I wish to acknowledge EEG Spectrum International for their support of this study, and especially for the loan of software utilized in the Intermezzo training project.

By Sara Palmer, Kay Harris Kriegsman, and Jefferey B. Palmer


Reviewed by Lisa Ottomanelli, PhD

*Spinal Cord Injury: A Guide for Living* was written to provide a roadmap to individuals and their families as they travel from the time of an initial spinal cord injury, through the rehabilitation process, and back out into the community. The authors draw on clinical and research reports, their own experiences working in the field of rehabilitation and psychology, and popular articles and autobiographical accounts. The numerous case examples included throughout the text provide a window for the reader into the lives of individuals living with spinal cord injuries. By sharing the unique perspective of these individuals, the reader comes away with the sense that there is no “right way” to adjust to spinal cord injury as there are many paths that one can take to finding their way back to living meaningful life after a traumatic injury. In this regard, the book is a useful resource and communicates a message of hope based in reality.

The book is divided into three parts. The chapters are organized from a chronological standpoint, that is, from injury to acute care, to rehabilitation, and then returning home. However, they may be read in any order. For instance, the reader may wish to start with a chapter that coincides with where they are at in terms of time since injury or they may simply choose to read selected portions that deal with topics of particular interest such as sexuality or finding a care attendant.

Part I covers the physical and emotional impact of spinal cord injury from the time of injury, through emergency room treatment, acute care, and rehabilitation.

This section provides a helpful and practical overview of the full range of emotional experiences that may occur after injury. It not only gives the reader permission to talk about these normal feelings, it reiterates the necessity do so at times. There is a nice treatment of hope and denial in the context of spinal cord injury and the chapter uses understandable language to help the reader distinguish between depression and grief. The adjustment process is outlined as the reader explores such issues as changes in appearance and self-image, self-concept and role identification, and the process of assigning meaning to the injury. Overall this section of the book does an adequate job of orienting the individual to what they can expect in the hospital. However, the introduction of various helping health care professionals is rather fragmented and undermines the team approach to rehabilitation that is practiced in most facilities. The patient is introduced to doctors, nurses, and physical, occupational, respiratory therapists in different sections of chapter one (trauma and hospitalization) and does not meet psychologists, psychiatrists, or social workers until the end of chapter two (rehabilitation).

Part II deals with the challenges of readjustment as the process of community reintegration and dealing with relationship issues are considered. Topics covered include family reactions and role changes, resuming old relationships and meeting new people, intimacy and sexuality, and working with personal care attendants. The attention to family and relationship issues is a considerable strength of this guidebook. A particularly helpful feature is that the point of view of different family members, including parents and siblings, are shared in the case illustrations. The authors provide practical suggestions for families to minimize the impact of the injury and provide mutual support to each other. The books stresses the importance of doing what fits for your family, that is, recognizing families strengths and capitalizing on what works to manage spinal cord injury. Throughout this section, the reader is given an appreciation for the constant rebalancing of roles and responsibilities that occurs after injury.

Part III addresses the area of research and examines the ongoing process of self-acceptance and successful adaptation throughout the lifespan. Current advances in healing the spinal cord and innovations in rehabilitation are discussed in layman terms and issues related to being a consumer and participant in research are outlined for the reader. The final two chapters build on an earlier theme that adaptation is an ongoing process as individuals blend what they have learned in rehabilitation with what works for their life and their personality. The information presented is solution focused and the reader leaves with the message that over time as they make choices about life disability becomes just one factor, albeit an important one, to consider.

Overall, the book provides a comprehensive guide for patients and their families coping with the emotional, physical, and practical challenges the spinal cord injury brings into their lives. Patients in the later
Books For Review: An Invitation

The Biofeedback Newsmagazine would like to include reviews of more books in future issues of the Newsmagazine. Priorities will include new books on applied psychophysiology and biofeedback, relevant research in psychophysiology, clinically useful books in behavioral medicine, and books written or edited by AAPB members. We also encourage reviewers to cover several interrelated books in one review. If you are aware of a book(s) that you would like to review, please contact Donald Moss at dmoss@noagate.com

We also receive review copies of many new books. If you are willing to review one of the following books, please contact Don Moss and we will send you a review copy. We will expect a finished review of 700-900 words within 60 days. The reviewing author may retain the complimentary copy once the review is complete.

Current books awaiting review:


Review of: The Hidden Disorder: A clinician’s guide to attention deficit hyperactivity disorder in adults.


Reviewed by J. Lawrence Thomas, PhD, New York, NY

This book might become known as the coffee table book for adult ADD. It is slim, has an artistic cover, has a dozen or so charming, non-offensive cartoons, and costs over $40 by the time you walk out of the book store or exit your Amazon website.

This book was written as an overview for the psychotherapy clinician interested in adult ADHD, and it reviews the major areas in the field. The book is useful for this purpose, and would be a good choice for the professional who needed to get a quick sense of ADD (or ADHD, the current term, although I think this is inaccurate; these terms are used interchangeably). By now there are probably over a dozen books out on adult ADD, as it has become one of the most popular diagnoses of our time.

The structure of the book consists of presenting the history of the disorder, then a number of brief case vignettes woven into chapters on assessment, diagnosis, comorbidity, medication, and therapy. In the appendices are various resources, such as organizations, web sites, popular and academic books, and a few references. The appendices are weak compared to other aspects of the book, as there are five times the resources available as those listed. But for the novice, this will get you started.

Resnick’s views are completely mainstream. Resnick reviews the basics, then introduces his own framework for ADHD. Officially, there are three types of ADHD—the Inattentive, the Hyperactive-Impulsive, and the Combined types, the latter combining the first two sets of symptoms. The criteria for ADD are 18 symptoms listed in the Diagnostic and Statistical Manual of the American Psychiatric Association (1994). Resnick makes four clusters of symptoms: Inattention, Impulsivity, Distractibility, and Hyperactivity. He then utilizes this taxonomy throughout the book.

This view reflects some current concerns in the field which are legitimate to examine. Most of the research in the field has been done with hyperactive/impulsive children, and this is where the criteria have been derived. And although some studies have followed subjects into adulthood, there is still little known about the ADD adult. Although the current DSM-IV wording strives to include adults, there is some question whether the 18 criteria are as applicable to adults with ADD as they are to children. For example, adult complaints you might hear from ADD adults, but not mentioned in DSM-IV could be:

Procrastination, poor time management,
involved in too many projects and completing none, and ability to deal with long term commitments and projects. Several in the field believe the cutoff should be less stringent for ADD adults. Instead of needing six out of nine in either set of symptoms, one could qualify by having only five, especially if the symptoms were really troublesome.

One key problem in the diagnosis of ADD is that the symptoms cannot be due to some other disorder. Plenty of other disorders can have forgetfulness, distractibility, and poor organizational skills. So you have to do something to make sure that what you have is ADD. Like most people in the field of ADD, Resnick is not keen on testing, primarily because there is no “litmus test” for the disorder. But this is also true of almost every psychological disorder.

Diagnosis ideally considers several sources of information, each helping to clarify the picture or rule out an alternative view. Tests can help this process. But one has to know what one is doing. For example, the various personality tests such as the MMPI-2, Personality Assessment Inventory, and Millon are problematic for not only ADD patients, but any patient who has a neurological disorder. This becomes especially salient in the forensic setting in which these patients have distorted personality profiles because their neurological problems are seen in psychological terms. Resnick does not seem to be aware of this assessment problem with ADD adults.

Contrary to Resnick’s point of view, a number of tests and checklists have been shown to add discriminative value in diagnosing ADHD, including the Conners’ Continuous Performance Test (CPT), the Test of Variable Attention (TOVA), the Intermediate Visual & Auditory Test (IVA), the Attention Deficit Disorders Evaluation Scale (ADDERS) by McCarney (1989), and a number of other behavior rating scales (Cf., Lubar, in press). In addition, evidence is growing that a sampling of EEG activity at the vertex (Cz), using the theta/beta ration, can discriminate individuals with ADHD with at least 90% validity (Monstra, Lubar, & Linden, 2000; Monstra, Lubar, Linden, Van Deusen, Green, Wing, Phillips, Fenger, 1999; Lubar, in press).

Resnick also states that a full IQ assessment “generally provides minimal discriminative information in making the diagnosis of ADHD.” Apparently he is not aware that there are studies supportive of the diagnosis of ADD in the WAIS-III Technical Manual (Psychological Corporation, 1997, pp. 174-5); therefore doing a full Wechsler Intelligence Scale can be quite useful.

On another matter Resnick mentions that “LD may stem from educational gaps in their acquired knowledge.” But the definition (in DSM-IV) explicitly excludes those who have not had adequate education. His comment that “tutoring or other academic intervention can ameliorate these problems” misses the point about LD completely—that it is a significant disorder unto itself, not likely to be ameliorated easily.

Regarding treatment for ADHD, Resnick subscribes to the usual, and supports medication as the first line of treatment. Medication has in fact been shown to be superior to all other forms of treatment, especially in recent studies, even though medications, of course, do not teach skills, self regulation, or insight. Resnick is very supportive of psychotherapy and makes it clear that working with the ADD adult may be different than the usual kind of therapy, and that more structured and defined methods may be required. He does not develop this into a true methodology, however.

Biofeedback is not mentioned at all in Resnick’s book, and this is to be expected. Although those of us who do biofeedback regularly can recommend it for many psychiatric disorders and a number of medical problems, biofeedback is still not widely accepted in ADHD research and treatment circles.

“Neurobiofeedback” is given two paragraphs, however. Although Resnick is rather positive about neurofeedback, he mentions (as everyone does) that there is little hard scientific data. He unfortunately concludes this presentation with the fact that because the 1997 Technology Evaluation Center of BlueCross BlueShield, National Association concluded that improved health outcomes were not established, this intervention is not covered by insurance. Additionally, there seems to be almost no awareness of the recent studies and reviews about QEEG and neurofeedback (Evans & Abarraban, 1999; Nash, 2000).

Is this the book to buy? It has many positives, is well written, and reasonably accurate. But it does not support what we do.

References


Children’s Migraine

The American Academy of Neurology has posted a report on its website (www.aan.com) that both relaxation training and biofeedback can be beneficial for children with migraine headache. The posting summarizes an article by Scott W. Powers, PhD, of the Cincinnati Children’s Hospital Medical Center, which appeared in the January 9, 2001 issue of Neurology. Twenty children in the Powers study were taught deep breathing, muscle relaxation and guided imagery techniques, and encouraged to practice these skills at home three times a week, and at each onset of headache. The children also underwent thermal biofeedback. The study reported increased temperature at each training session, and a reduction in self-reported intensity and duration of headache. The AAN report concludes that biofeedback-assisted relaxation training can be efficiently and effectively integrated into the standard medical care provided to the many children who experience migraine headache. The AAN report on the study is simple and positive, and would make an effective handout for physicians and referral sources. [D. Moss]

Must Read Article


Kenneth Holroyd and his colleagues report in JAMA on a rigorous study on 203 adults with chronic tension headache. They randomly assigned the subjects to four conditions: placebo, tricyclic antidepressant medication, stress management, and a combination of stress management with medication. The results show that both tricyclic medication and stress management produced larger reductions in headache activity and pain medication use than placebo. Tricyclic medications produced more rapid improvements. However, combined therapy (stress management plus tricyclics) was most likely (>50 %) to produce clinically significant reductions in headache activity compared to the other conditions.

The stress management condition included only three hours of relaxation skills training (including deep muscle relaxation of sixteen muscle groups), cognitive skills training, problem solving techniques, and guidance in applying these skills to pain management. The three hours of clinical contact were supplemented with instruction manuals, audiotapes, and telephone contact. The protocol shows that even in a minimal contact format, the basic tools of stress management are powerful tools for intervening with medical problems. Kenneth Holroyd and his colleagues have performed an enormous service to the applied psychophysiology profession by getting this message to the medical community. Their research was funded by the National Institute of Neurological Disorders and Stroke, of NIH. [D.Moss]

NCCAM Research Effort on the Science of the Placebo

Members of AAPB should be aware of the following two RFA’s for interdisciplinary research, on 1) The Placebo Effect in Clinical Practice, and 2) Elucidation of the Underlying Mechanisms of the Placebo Effect. Psychophysiological methods should be at the center of research on the placebo, and AAPB encourages its member researchers to participate in this NIH placebo initiative.

Based on a scholarly assessment of the state of the field, participants in a trans-NIH workshop held in November 2000 (http://placebo.nih.gov) developed an interdisciplinary research agenda to further elucidate the science of placebos and the applications of this knowledge in clinical practice and research. To implement these recommendations, the National Center for Complementary and Alternative Medicine (NCCAM) plans to release two inter-institute sponsored Requests for Applications (RFAs) in September 2001. Detailed descriptions of the concepts underlying these RFAs are contained in the NIH guide. (http://grants.nih.gov/grantsguide/notice-files/NOT-AT-01-003.html)
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Doc Childre is president and CEO of HeartMath®, LLC, a training and consulting organization specializing in the problems of human stress, quality, creativity and effectiveness. Doc is also the founder of the Institute of HeartMath, a nonprofit research and educational organization, and is consultant to Fortune 100 companies on Intui-Technology®, a system designed to create quantum time shifts in decision-making and productivity.

Roxann Intriligator, MS, R.N.,
Roxann Intriligator is a clinical nurse specialist in Psychiatric-Mental Health Nursing and is certified in biofeedback, neurofeedback and holistic nursing. She is a past President of the Biofeedback Society of New York. She has lectured and written on topics in biofeedback, and she has assisted in research on biofeedback. She is presently practicing biofeedback at Carmel Psychological Associates in Carmel, New York.

Rollin McCraty, PhD
Rollin McCraty is Director of Research of the HeartMath Research Center at the Institute of HeartMath in Boulder Creek, California. His research interests include the physiology of emotion, with a focus on the mechanisms by which heart-based positive emotions influence cognitive processes, behavior and health. Findings from this research have been applied to the development of tools and technology to optimize individual and organizational health, performance, spiritual well-being and quality of life.

Angele McGrady, PhD, MEd, LPCC
Angele McGrady received her B.S. from Chestnut Hill College in Philadelphia, her Masters from Michigan State University and her PhD in Biology from the University of Toledo. She also holds a Masters degree in Guidance and Counseling. She is licensed as an Ohio Professional Clinical Counselor and is certified by the Biofeedback Certification Institute of America.

Currently Dr. McGrady is a professor in the Department of Psychiatry and holds a joint appointment in the Department of Physiology and Molecular Medicine. In 1997, Dr. McGrady received the Dean’s Award for Teaching Excellence from the Medical College of Ohio. She maintains a practice in counseling and biofeedback in the Department of Psychiatry. As Director of the new Complementary Medicine Center, she oversees services, education and research initiatives in Complementary Medicine. Dr. McGrady is a past President of the Association for Applied Psychophysiology and Biofeedback, and a current Associate Editor of the international journal Applied Psychophysiology and Biofeedback. Her curriculum vitae lists more than 50 peer reviewed publications,
numerous abstracts and 4 book chapters. In March, 2000, Dr. McGrady received the Distinguished Scientist Award from AABP.

**Donald Moss, PhD**

Donald Moss, PhD, is a partner in Western Michigan Behavioral Health in Grand Rapids and Grand Haven, Michigan, and directs Chronic Pain Services. He is Editor of the Biofeedback Newsmagazine and Consulting Editor for the Journal of Neurotherapy. He is adjunct graduate faculty of the Saybrook Graduate School and Research Center in San Francisco. His primary interests are the application of clinical psychophysiological knowledge and interventions to the anxiety disorders, and to the functional problems of primary care medicine. His current book in progress is Handbook of Mind/Body Medicine for Primary Care (Sage).

**Lisa Ottomanelli, PhD**

Lisa Ottomanelli is an Assistant professor in the Department of Psychiatry at University of Texas Southwestern Medical School in Dallas and the staff psychologist for the Spinal Cord Injury Center in the Veterans Affairs North Texas Health Care System. Her primary research focus has been in the area of personality and substance abuse among the mentally and physically disabled. She can be reached at Lisa.Ottomanelli@med.va.gov

**John D. Perry, PhD, M.Div., BCIA-C, Dip.ABS**

John Perry is a psychologist who has specialized in biofeedback for over 25 years. While he is best known for his invention of the vaginal/rectal EMG sensor now used to treat urinary and fecal incontinence, he financed that research and development by treating many headache and chronic pain patients in two decades of private practice. His professional website is www.InContiNet.com.

**Gabriel E. Sella, MD**

Gabriel Sella is a physician specialized in family and preventive medicine as well as occupational, disability and pain management. His research and teaching focus on muscle physiology, electromyographic assessment, and biofeedback. He has published five textbooks and over fifty articles, and has given numerous professional presentations and seminars nationally and internationally. He is a board member of SESNA and the American Academy of Pain Management, has seven fellowships and three board certifications. He is particularly interested in the subject of myofascial pain and its treatment, with special emphasis on electromyographic assessment and neuromuscular reeducation.

**Sebastian Striefel, PhD**

Sebastian “Seb” Striefel became a Professor Emeritus in the Department of Psychology at Utah State University in September 2000. For twenty six years he taught graduate level courses in ethics and professional conduct, clinical applications of biofeedback, clinical applications of relaxation training and behavior therapy. He was also the Director of the Division of Services at the Center for Persons with Disabilities at Utah State University. In that role he managed a variety of programs, including an outpatient clinic, a biofeedback lab and an early intervention program. He is a past president of the Association of Applied Psychophysiology and Biofeedback (AAPB), current president of the Neurofeedback Division of AAPB, Secretary/Treasurer of the International Section of AAPB and regularly writes an ongoing ethics column and conducts workshops on ethics, standards, and professional conduct.

**Rae Tattenbaum, LCSW**

Rae Tattenbaum, a licensed clinical social worker, has more than 30 years' experience coaching students and actors, business people, golfers, and opera singers in achieving peak performance. A pioneer in using neurofeedback to harness mental energy, Tattenbaum is featured in Jim Robbins's May 2000 book A Symphony in the Brain: The Evolution of the New Biofeedback. Tattenbaum is featured in Jim Robbins's May 2000 book A Symphony in the Brain: The Evolution of the New Biofeedback. Tattenbaum earned her BA and completed advanced study in Theatre Arts at Hofstra University. She also has an MSW from the Columbia University School of Social Work. She delivers workshops in New York City and in Connecticut, where her work has been covered extensively in the local media.
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Invest wisely in your practice — Insist on flexibility, ease of use, and affordability!
Dear Members of AAPB,

In our November Board meeting in Chicago, your AAPB Board engaged in a creative dialogue about AAPB’s name and identity as AAPB matures and enters its 32nd year. We concluded that AAPB’s public image and professional identity are in need of rejuvenation. We determined to promote an image of AAPB as “an international society for mind-body research, health care, and education.”

AAPB began in 1969 as the Biofeedback Research Society, evolved later into a mixed clinician and researcher organization as the Biofeedback Society of America, and then in 1988 attempted to broaden its identity by renaming itself the Association for Applied Psychophysiology and Biofeedback.

In our professional lives, biofeedback is a small yet crucial part of what we do. Most members of AAPB conduct research, teach, or practice clinically utilizing a relatively wide array of interventions, methodologies, and techniques. A variety of terms and concepts come to mind to describe what we have in common: a mind-body approach, a bio-behavioral approach, an active mastery orientation, a self-efficacy model, an emphasis on self-regulation skills, and an emphasis on scientifically derived learning principles, providing awareness and control of one’s own body.

Yet, we are also The Biofeedback Society. When state legislatures, insurance companies, and professional organizations consider decisions regarding biofeedback, they listen to our opinion, because we are the ultimate professional voice about biofeedback. Biofeedback also remains our most recognized “brand name” – familiar to lay people and professionals. This is something we must not throw away.

Applied psychophysiology is an accurate, comprehensive, and respected name for our professional activity. Mark Schwartz defined the term in the following way:

“In the broadest sense, applied psychophysiology may be thought of as reflecting an evolving discipline or specialty that uses knowledge from the basic science fields, primarily psychophysiology, to help to help people change physiological functioning. The term “applied psychophysiology” is a rubric encompassing evaluation, diagnosis, education, treatment and performance enhancement” (1999, p. 5).

Unfortunately, the applied psychophysiology label often raises eyebrows and questions when used with lay and medical audiences. The term psychophysiology combines the two Greek roots psycho and physio, designating the realms of mind and of body. “Mind-body health care” and “mind-body education” may be better designations for what we do, because they are more self-evident for the public, and because they resonate with associations connected with many parallel professional approaches. We need to use names for our professional activity which excite interest, and which facilitate professional collaboration with other professional movements such as traditional Chinese medicine, energy medicine, other body therapies, and so on.

We can no longer afford to be unconcerned about our public name, marketing image, and identity. It is frustrating for our members to read encouraging research studies and clinical reports, and then to find that they cannot obtain authorization to apply the most effective bio-behavioral protocol to a patient’s condition. The general public is hungry for complementary and alternative therapies. Much of what the public looks for today in CAM has been offered by our approach for thirty years, but we have failed to somehow capture the imagination of the public with our procedures, research, and reports.

Elsewhere (Moss, in press) I have identified several of the values and emphases that seem to draw the public to CAM:

1) Emphasis on a holistic and unitary view of mind, body, and spirit.
2) Treating the patient as a unique human being and person.
3) Emphasis on a more personal, support

continued on Page 6A
FROM THE
EXECUTIVE DIRECTOR

Chicken Soup for the Mind-Body-Soul
Francine Butler

Being under the constant pervading knowledge that life is not the same appears to be our current definition of "normal". Nevertheless, since 9-11, we seek to surround ourselves with areas of comfort – place, people, and food. The natural definition of those three elements to me is family.

Now, more than ever, we are bombarded with constant information (sometimes more than we want or need to know). A commentator delivers the news with several running text bars at the bottom of the screen. So you both hear dialog and read supplementary information.

The stress levels are rising. The need for management tools to help us all cope is rising. Who do we turn to? Who better, at the professional level, than our own AAPB members?

We have much to offer the community, our friends and our clients. We are the best-equipped professional organization to provide help, because we have the skills and the broad based backgrounds with which to apply the skills.

And at the personal level, how many times have I heard members at the meeting say “It’s good to be home with the family again.” Come to the meeting in Las Vegas and share a big hug. Enjoy the people, place and family of AAPB. We may not serve chicken soup at the member breakfast, but we will offer comfort for the mind-body soul.

Francine Butler PhD

Saturday, March 23, 2002
7:00PM - 8:00PM
SPECIAL PRESENTATION

Study of Voluntary Control of Pain and Consciousness Through Yoga: Demonstration and Physiological Recording and Discussion

Mitsumasa Kawakami and Erik Peper, PhD

What is the connection between consciousness, mind and body? How can healing occur? How can you control pain? Explore the limits of human potential and growth!

A psychophysiological exploration of voluntary control of pain and bleeding by piercing the tongue and neck with a 3mm needle by Mr. Mitsumasa Kawakami. He is the founder and Chief Executive Director of his own school of yoga and Institute for Research of Subconscious Psychology in Fukuoka and Tokyo, Japan. The Indian Yoga Culture Federation bestowed the title of Yoga Samrat upon him in 1983 after he demonstrated that he had reached the highest level of proficiency in his discipline.

We Encourage Submissions

Send chapter meeting announcements, section and division meeting reports, and any non-commercial information regarding meetings, presentations or publications which may be of interest to AAPB members. Articles should generally not exceed 750 words. Remember to send information on dated events well in advance (we may be able to publicize your event more than once if you get your calendar to us early enough).

Send Word (.doc) or text files by e-mail to the News and Events Editor: Ted LaVaque, PhD
tlavaque@dct.com by March 15 for the Summer Issue.
Training and Education for Professionals of the Next Generation: Our Role as Mentors of the Next Generation of Scientists

Christine Hovanitz, PhD
Director of Health Psychology, University of Cincinnati

At some point in a career, the focus on building and practicing expertise changes to concern about the next generation. One begins to consider how to best help build the next generation's competencies, and help prepare them for their role in expanding the knowledge base. In applied psychophysiology and biofeedback, special issues are involved. Few of the next generation will have the support of a fully accredited academic program dedicated to applied psychophysiology. Nearly all will approach this training from the perspective of another recognized tradition in academia. So when our orientation switches from the narrow focus on immediate career needs and demands, how do we become "generative" of the next generation? Difficulties abound; future professionals come from nearly all health care professions, and are located everywhere.

The complexity of the issue originates with the history of applied psychophysiology and biofeedback. Perhaps it is helpful, in understanding what we should do, to review from where we came.

The bigger, historical picture:
Biofeedback originated primarily from the work of academics, within academia, Neal Miller's lab at Rockefeller University and A. H. Black's work at McMaster provided intriguing data from animal research. About the same time, H. D. Kimmel at the University of South Florida and B. Engel at NIH, were able to demonstrate that some autonomic nervous system functions, previously thought to be impenetrable by operant learning, could be learned (Birbaumer & Flor, 1999; Kimmel, 1979; Schwartz & Olson, 1995). Dramatic demonstrations of the potential led to great hope that biofeedback could serve a medicinal function.

Considerable research verified that hope, but soon began to set some realistic expectations for degree of success.

In all likelihood, the exaggerated early claims for the effectiveness of biofeedback (Gatchel, 2001), in combination with an absence of ability to insure quality intervention and the appearance of more tempered scientific data, worked together to limit the growth of academic programs specifically in biofeedback. Biofeedback slowly emerged from the ruins of fantastic claims to take a respected place as an efficacious intervention for several physical dysfunctions. Biofeedback is not often the only effective treatment procedure for a given dysfunction, however, and issues of cost effectiveness, presence or absence of negative side effect, and comparative efficacy are concerns today. And the scope of the field has grown; assessment is as integral a part as therapy. The expansion of psychophysiology into many areas of clinical import forced a realization that the label "biofeedback" is too limiting to be meaningfully descriptive.

Relatively recently, the term "applied psychophysiology" became more central to the field than "biofeedback". Considerable dialogue took place about the transition (Schwartz & Olson, 1995). In 1988 the Biofeedback Society of America (BSA) became the Association for Applied Psychophysiology and Biofeedback (AAPB). The change was argued for in the face of a number of factors, in addition to those just mentioned. Practitioners used many more therapy methods than biofeedback. Researchers at universities reported that the term biofeedback was too limiting, and hindered their ability to publish or obtain research grants. More discussion followed rather than preceded the change of the organization name, as professionals sought a guide to understand the boundaries of the field of applied psychophysiology (see 1999 volume 24, issue 1, of Applied Psychophysiology and Biofeedback for a synopsis of arguments).

But the institutions charged with conducting research on the emerging specialty, primarily the universities, did not create training programs for applied psychophysiology and biofeedback for the most part. Further, although a recognized specialty by the American Psychological Association (APA), training standards in clinical psychophysiology are described by the Biofeedback Certification Institute of America (BCIA), an association closely related to AAPB, rather than by APA. It is clear to APA that diverse expertise was (and is) needed for proper training of practitioners, but the multidisciplinary nature of the speciality creates formidable (but not insurmountable) difficulties in providing training. The necessary professionals tend to reside in even more diverse departments and colleges, making a collaboration less likely.

If universities do not often provide degree-granting programs in applied psychophysiology, where does training come from? To facilitate the growth of our next generation of professionals, we need to identify what they need to learn from us.

The smaller, immediate picture:
Thoughtful preparation for what is required has already taken place, although certainly this process is never complete. The BCIA has described minimum qualifications for certification for the practice of biofeedback (which can be extended, perhaps, to applied psychophysiology). These minimum criteria are directly relevant to any practitioner,
Training and Education

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whether or not formal certification is obtained. BCIA provides the credentialing of expertise in the specialized area of general biofeedback and EEG biofeedback. Prerequisite education for certification is carefully specified (see http://www.bcia.org/ for details).

For both general and EEG certification, a bachelor's degree (or higher) from a regionally accredited academic institution in a health care field is generally necessary. In addition, the following experiences are required:

a) Fifty hours (40 hours for neurofeedback) in didactic biofeedback education. This can be obtained from a regionally accredited university course or a BCIA training program. The content of didactic education is carefully detailed in the BCIA blueprint areas for both general and EEG biofeedback.

b) One hundred supervised hours of EMG and thermal biofeedback, or 220 supervised hours of EEG biofeedback.

c) A comprehensive course in human anatomy, human physiology, or human biology form a regionally accredited academic institution or a BCIA accredited program.

BCIA provides credentialing that serves as the major quality control for biofeedback practice. While all who practice applied psychophysiology and biofeedback have not obtained certification, the minimum qualifications should inform all of minimum standards for practice. These criteria are also helpful guidelines for all interested in encouraging aspiring applied psychophysiology and biofeedback professionals.

How to facilitate the interested student's training: Academia brought applied psychophysiology and biofeedback into being; academia, as the primary home for professional schools, ideally would continue to provide basic training (such as course work in applied psychophysiology and biofeedback). A large number of workshops are providing an essential contribution to the field, particularly for the established professionals seeking to expand their competencies. Yet, to meet the needs of the emerging professionals and to provide the introduction that sparks this interest, basic training in applied psychophysiology and biofeedback is required at the universities. An increased presence at universities will also serve to encourage research and result in an expanding knowledge base. So how can the professionals whose interest now turns them toward a concern for the future generation help?

A) Applied psychophysiology and biofeedback professionals can seek affiliations with local universities and medical schools, and help in the clinical supervision of their students;

B) Professionals affiliated with universities are strongly encouraged to offer courses and supervise apprenticeships at the undergraduate and graduate levels;

C) Professionals who are affiliated with internship or postdoctoral clinical training institutions can offer supervision of applied psychophysiology and biofeedback, and make known their expertise and opportunities in descriptions of their programs.

Many other opportunities to aid in the preparation of the next generation of professionals are available. All forms of public education in applied psychophysiology and biofeedback will encourage the informed dissemination of treatment options. In the present time, where alternative medicine is highly publicized, applied psychophysiology and biofeedback needs to take its proper role as the scientifically based, most grounded self regulatory intervention of the mind/body connection. Education of the next generation of professionals follows. Certainly, it becomes our responsibility to devote our time to these generative tasks. There are many ways to help the clients and patients who seek our services: facilitating the growth of aspiring professionals who will follow us is one of the most important contributions we can make.

References


Comments and suggestions should be addressed to Christine.Hovanitz@UC.EDU

Donate Your Superfluous Biofeedback Equipment and Lap-Top Computers

Many students want to do research in biofeedback and psychophysiology but can't afford to purchase equipment. There is currently no central source to arrange temporary loans of equipment. AAPB's Research and Instrumentation Committee is working with the Behavioral Medicine Research & Training Foundation to fill this need. We need working biofeedback equipment less than 15 years old with all sensors in good condition. We also need older laptop computers as much of the older equipment will not run on modern computers. We will loan the equipment to students who have approved psychophysiology projects in return for a small, refundable care deposit, and acknowledgement to AAPB and the Foundation in any publications resulting from use of the equipment. The Foundation is a Federally approved 501 c 3 non-profit organization so can provide you with a letter acknowledging your contribution, to support a tax deduction. For further information, please contact Rich Sherman at rshearan@uwisc.edu or (608) 598-3853.
Tribute To A Friend

Dr. Coleen Shannon served as Chairperson for the Biofeedback Certification Institute of America in 1999-2000, one of two female chairs since its inception in 1981. She was born October 17, 1940 and died October 11, 2001. The following tribute to Coleen was given at her memorial service by Jan Alexander and Wayne Martin. At Coleen's request, the Staple Sister's rendition of "Respect Yourself" was played during the service. It was Coleen's final lecture.

Who Was This Mary Coleen Shannon?

Jan: She was a nun, floating gracefully down the halls of the University of Texas at Arlington School of Social Work. She always had that look about her. You know the look nuns have - serene, at peace, all knowing, all forgiving - even when her students asked the stupidest of questions. She had that way of making you feel it was the right question, and indicated you had such a intelligent mind to inquire.

Wayne: Sometimes I thought she was the Momma Duck. You could see all her little student ducklings following behind her at any given time of the day!

Jan: Coleen was often a little kid at heart. I remember when Coleen was advising a student on her graduation plan and what classes to take. It was Halloween. Picture this - Coleen was dressed as a Pumpkin. Her long skinny legs in green tights, this huge round pumpkin shape on her body, and a green stem hat. Coleen kept nodding to the student, saying, "Yes, that is a good plan." The student looked up and said, "It's hard to take you seriously with your stem bobbing!"

Wayne: I usually thought of Coleen as being a forward thinker, but occasionally she liked going backwards, checking out the dessert menu before deciding on her entree.

Jan: Did you think of Coleen as the ultimate little homemaker? Well, neither did I. But, she did win the Betty Crocker Award in high school!

Wayne: Coleen was a teacher who taught how to teach while she was teaching. In supervision, when one student would ask her a question, she would ask another student what would she do. She had a way of having her students teach and learn from each other.

Coleen had that rare quality which a choice few professors have. She treated you as a peer, instead of a student.

Jan: I can still hear Coleen's laughter when she saw Wayne Martin and me practicing for our Biofeedback Certification Institute of America practicum exam. Wayne and I were role playing the examiner and the examinee. He was pretending to be Dr. Sigmund Freud and I was Phyllis Diller. Oh, the look on her face...

Wayne: Coleen loved and lived her passion for animals and biofeedback. Who could ever forget her formal presentation to the Biofeedback Society of Texas. She reported, as a researcher, on her work using biofeedback to train her nausea prone poodle, Alex, to "just relax" and not get carsick. Sure, biofeedback was "going to the dogs." Who would have had it any other way?

Jan: Coleen was very much laughter, courage, love, compassion, goodness and light.

Wayne: Let us honor her by being as she was.

Coleen Shannon was a professor at UTA for more than 30 years. She was also known to many as a counselor, biofeedback therapist and trainer, researcher, publisher, and child welfare consultant. Coleen obtained her bachelors degree in Sociology and Psychology from Texas Christian University, her Masters of Social Work from Tulane University, and her PhD in Sociology from Texas Women's University. She was a board member or committee member of The Biofeedback Society of Texas, Biofeedback Certification Institute of America, Texas State Board of Social Work Examiners, Handicapped Resources Association, in Arlington, Texas, The Food Bank of Greater Tarrant County, Swiss Avenue Pain Management Center, in Dallas, Catholic Charities in Fort Worth, and United Way of Tarrant County. Coleen received the Lifetime Achievement Award from the Texas Chapter of the National Association of Social Workers in the year 2000.

Barbara Brown, PhD, AAPB's First President

We have recently learned that Barbara Brown passed away in 1999, at a Rancho Mirage nursing home where she had lived, post-stroke, for several years. A Veterans Administration researcher, Dr. Brown was one of the organizing founders of AAPB (then called the Biofeedback Research Society), served as the first president of AAPB (from 1969-1970), and was among the first and most successful to make the public aware of the power and potential of biofeedback.

Her lay books on biofeedback (New Mind, New Body, and Stress and the Art of Biofeedback) were widely read and well received in the early seventies, and still stand up as good reads for most biofeedback applications.

AAPB is seeking photos, anecdotes, and memories about Dr. Brown, her work, and influence, in preparation for assembling a tribute to her to be presented at the annual meeting and in the Biofeedback Magazine.

Anyone wishing to make a donation in her memory, may send a contribution to the AAPB Foundation, 10200 W. 44th Ave., Suite #304, Wheat Ridge, CO 80033. Foundation support for student scholarships would be a fitting tribute to Barbara Brown.

[Rob Kall]
AAPB
continued from Page 1A
4) Attribution of an active role to the patient in the healing process.
5) Belief in the inherent healing power of the living organism.
6) Prescription of life-style and habit changes to optimize health.
7) Emphasis on interventions that elicit the body’s healing powers.
8) Distress of invasive treatments that crush disease but harm the patient as whole.
9) Belief in eclecticism and empiricism.
10) Readiness to accept unconventional interventions and unorthodox theoretical models that appear to work.
11) Openness to prayer, meditation and spiritual practices as supportive for healing and health.
12) Integration of physical, psychological and spiritual practices.

Most of these values apply very well to the practice of biofeedback, self-regulation training, and mind-body therapies that our members practice. For our own survival, and for the public good, we must seek to align our work with that of other CAM groups. In the process, wherever possible, we must also collaborate with those groups and stand together in the pursuit of 21st century health and education.

In September a committee headed by President-Elect Paul Lehrer considered priorities and objectives for our journal. One of their very timely suggestions was to give the journal a subtitle, something like: Applied Psychophysiology and Biofeedback: A Scientific Journal for Mind-Body Interventions. The journal editorial board will consider adopting a subtitle something like that, and will communicate with the membership about this later.

Our Board dialogued and debated at length in November in our Chicago meeting. We came to a conclusion. We will not change our official name. We value the academic respectability of psychophysiology, the well-known brand name of biofeedback, and AAPB’s public role in promoting legislation and insurance acceptance for biofeedback. However, in the future we will add to our public presentation a new “tag line” — a secondary description of what we do, which will define our activity in more contemporary terms. We are open to dialogue with AAPB members in the next several months to refine this “tag line” further. Our artist is working on an attractive way to depict the acronym AAPB, perhaps with the two elements of “applied psychophysiology” and “biofeedback” emphasized artistically. But that line below our name will define us in a new way:

AAPB — An international society for mind-body research, health care, and education.

Donald Moss, PhD, AAPB President

References


December 28, 2001

Valerie Butter Braschel, President,
Kenneth R. Lofland, PhD, President-Elect
Board of Directors and Members, Biofeedback Society of Illinois

Dear Valerie, Ken, and BSI members:

On behalf of the Association for Applied Psychophysiology and Biofeedback, I extend our gratitude to Valerie Braschel, Kenneth Lofland, the BSI Board, and the BSI membership for the gracious hospitality extended to all attendees at AAPB’s Fall workshops in Chicago, in November 2001.

Our Board members were impressed with the quality of the scientific programs presented by Drs. Lofland and Baehr on Friday evening November 9, as well as by the careful arrangements made for the hospitality reception at the Excalibur. We were also impressed by the number of BSI members in attendance. Your support contributed to the overall success and positive atmosphere of the Fall workshops.

Thank you for your service to the biofeedback community of Illinois and your service to AAPB.

Cordially and respectfully,

Donald Moss, PhD

Biofeedback
Winter 2001
We encourage you to attend a very special AAPB Annual Meeting. Once again we will be offering Workshops, Keynote Addresses and Special Presentations representing the wide range of talent and interest that is the hallmark of our Association. It is our ambition this year to focus both on the needs of students and newcomers to the field, and to stretch the imagination and intellect of everyone as we consider topics once considered ‘out of bounds’ by science. In addition to the popular Clinical Forums, the Riviera Hotel has made available a beautiful sky-top dining room for several lunchtime special presentations.

Many of the Sections are sponsoring exciting keynote speakers who will join Gary Schwartz, PhD, Charles Tart, PhD, Daniel Handel, MD, and other internationally known presenters. From Dr. Tart’s Keynote: ‘Circle of the Soul—Merely a Nice Metaphor or Something Vitally More?’, to Dr. Handel’s integration of hypnosis and psychophysiology for end-of-life cancer care, to the challenge by Dr. Schwartz to consider universal consciousness, this is a meeting not to be missed!

Session Topics to Include:
• Neurofeedback
• Fibromyalgia
• Audio Visual Entrainment
• Anxiety
• SEMG
• Optimal Functioning
• ADHD
• Basic Psychophysiological Instrumentation

Pre-Conference Workshops:
• BCIA General Biofeedback Didactic Education Workshop
• Two-Day Didactic Training in General Biofeedback
• BCIA General Biofeedback Didactic Instrumentation Workshop
• BCIA EEG Biofeedback Exam Preparation Course

Pre-Meeting Advanced Institutes
• Advanced Topics in Neurofeedback
• Advanced Topics in SEMG

33rd Annual Meeting
March 20-24, 2002
Advanced Neurofeedback & SEMG Pre-Conference Institutes – March 20 & 21
The Riviera Hotel, Las Vegas, NV
Association for Applied Psychophysiology and Biofeedback

Keynote Speakers Include:

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Frank Andrasik, PhD
Jeffrey R. Cram, PhD
Daniel L. Handel, MD
Lynda Kirk, MA, LPC, BCIAC, QEEGT
Julie Beasley
Paul L. Nunez, PhD
John D. Perry, PhD, MDiv, BCIAC
I. Jon Russell, MD, PhD
Gary E. Schwartz, PhD
Charles T. Tart, PhD

33rd Annual Meeting
March 20-24, 2002
Advanced Neurofeedback & SEMG Pre-Conference Institutes – March 20 & 21
The Riviera Hotel, Las Vegas, NV

Accommodations
The Riviera Hotel is the official hotel of AAPB’s 33rd Annual Meeting. AAPB has reserved a block of sleeping rooms at the Riviera Hotel at a discounted rate for our attendees, $110 single/double per night until February 18, 2002. Reservations are on a space-available basis after the above cut-off date.

Your support in staying at the Riviera Hotel helps keep AAPB meeting costs down, which directly affects you as a member.

For reservations, please contact the Riviera Hotel at (800) 634-6753 or (702) 794-9412 and identify yourself as an AAPB attendee to receive the discounted room rate.

Travel
AAPB has negotiated special discounts for car rental with Budget and airfares with United. If you need assistance with travel arrangements, contact Preferred Travel Services at (800) 848-6864 or (303) 298-7050 or fax requests to (303) 298-7090 Monday - Friday, 9:00am - 6:00pm MST. Please identify yourself as an AAPB attendee.

Please note: The AAPB Annual Meeting will take place during the week of Spring Break in some areas, so please make your travel reservations early in order to obtain discounts.

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is proud to continue the very successful workshop series attended by hundreds of professionals over the past number of years. The workshops are divided into introductory and advanced groups to match the changing needs of BioGraph users.

Introduction to BioGraph

Get acquainted with a better, more powerful software tool in this one-day workshop on BioGraph. You will be guided in the key processes of using and customizing the BioGraph software in a no stress atmosphere. You will learn how to develop effective and relevant screens, protocols, and reports. Clinically or technically trained experts in BioGraph will guide you. The emphasis is on hands-on learning of this powerful physiological tool.

Following this course you will:
- Have the ability to use colorful displays that will capture your clients' attention.
- Use sounds and audio feedback tools like never before, adding yet another dimension to your practice.
- Flow through the software with consummate ease, allowing you to fully concentrate on the session at hand, not the software.
- Be hooked on the BioGraph environment and it's many faces.

Advanced BioGraph with Health Professionals

Take your knowledge of BioGraph to the next level with the two-day advanced workshop. These workshops are taught by leaders in the clinical field who use BioGraph on a daily basis. Learn not only how to use the more advanced features but how they are relevant in your practice.

In short, you will learn:
- To develop screens that allow your biofeedback practice to come alive, adding interest for both your clients and yourself.
- To develop and use the report mode to document your work and assess progress both within a session and between multiple sessions.
- Real clinical examples.
- Audio, visual feedback and animation modes: how to apply them successfully to your client's needs.
- Proper sensor placement.
- To identify clinical conditions that respond well to neurofeedback and other modalities.
- To put it all together: implementing your clinical vision with ProComp™/BioGraph®.

Workshop Presenters

Helena Kerekhazi, M.S. Ed.
Neurofeedback & Learning/Behavioral Disorders

Joel F. Lubar, Ph.D.
Neurofeedback & General Biofeedback

Louise Marks, M.S., O.T.R.
Elimination Disorders
Neurofeedback & General Biofeedback

Stephen I. Sideroff, Ph.D.
Neurofeedback & General Biofeedback

Lynda Thompson, Ph.D. & Michael Thompson, M.D.
Neurofeedback & General Biofeedback
This workshop will cover the development of screens for neurofeedback assessment and treatment of disorders for which there is clear published evidence for efficacy. Dr. Lubar will show how to use the ProComp+/BioGraph system in setting up screens, including animations, artifact rejection, setting of thresholds, and use of the statistics to assess performance. The latter will include trend reports over sessions. This workshop will cover the background research for these areas and the current status of their development. The workshop will emphasize the use of the BioGraph software and the ProComp+ for work with feedback and assessment of other physiological modalities including temperature, EMG, electrodermal response, respiration, and pulse rate. This discussion will include psychophysiological stress profiling. The latter can be illustrated by a protocol which has been developed for stress analysis.

Dr. Joel Lubar received his B.S. and Ph.D. from the Division of the Biological Sciences and Department of Biopsychology at the University of Chicago. He has published more than 100 papers, many book chapters and eight books in the areas of Neuroscience and Applied Psychophysiology. He is a Full Professor at the University of Tennessee. He is past President of the EEG Division of the Association for Applied Psychophysiology and Biofeedback, and was President of the organization in 1996-1997. Joel Lubar is Co-Director of the Southeastern Biofeedback and Neurobehavioral Institute. His major focus of work involves the use of EEG biofeedback for ADD/HD, depression, seizure disorders, Tourette's and related tic disorders, and certain specific learning disabilities.

The instrumentation workshop taught by Helena Kerekhazi will help students to optimize their usage of Thought Technology hardware and software. From basic to more sophisticated operations, students will have extensive hands-on practice, benefiting from her 21 years experience of teaching technology to adults at whatever level they have achieved. It will also provide students with opportunities to design and customize their own screens and reports. It is recommended that those who have limited computer skills also take foundation courses in computer basics before the course so that they can focus on the use of this technology. Special requests for screens or reports should be sent to Helena at least two weeks before the course.

Helena Kerekhazi, M.S. Ed. is the founder of BioCare, Inc., a clinical neurofeedback practice in Scarsdale, New York. Here she treats ADD; ADHD; learning disabilities; behavioral problems; Tourette's Syndrome; closed head injuries; anxiety; pain and stress; panic attacks; addiction; compulsive disorders; autism; eating disorders; epilepsy; cerebral palsy and other bio-behavioral symptoms, as well as trains for overall peak performance.

Lynda Thompson, Ph.D., BCIA-EEG, is a Registered Psychologist with experience in teaching, clinical psychology, school psychology and ownership of learning centers. Since 1993 she has been Executive Director of The ADD Centre, a private service devoted to helping people improve behavior and learning. The clinic also deals with clients who have other disorders associated with poor attention including epilepsy, Asperger's Syndrome, learning disabilities, Tourette's Syndrome, closed head injury, autism, mood disorders, and anxiety. Her doctoral dissertation (1979) dealt with self-esteem in hyperactive children treated with methylphenidate. She is co-author with pediatrician William Sears of “The ADD Book: New Understandings, New Approaches to Parenting Your Child,” published by Little, Brown & Co. of New York.
Helena Kerekhazi, M.S., Ed.
Feb. 16 - 17, 2002 - Dallas, TX
April 6-7, 2002 - Hartsdale, NY
May 4-5, 2002 - Southfield, MI
Nov. 9-10, 2002 - Hartsdale, NY

Lynda Thompson, Ph.D.
Michael Thompson, M.D.
June 8-9, 2002 - Philadelphia, PA
July 13-14, 2002 - Seattle, WA
Oct. 5-6, 2002 - Toronto, ON
Nov. 2-3, 2002 - Austin, TX

Louise Marks, M.S., O.T.R.
Aug. 3-4, 2002 - Chicago, IL
( Elimination and Pelvic Floor Disorders)
Jan. 25-26, 2003 - Sacramento, CA

Joel Lubar, Ph.D.
Mar. 9-10, 2002 - Atlanta, GA
Sept. 21-22, 2002 - Cincinnati, OH
Dec. 14-15, 2002 - Ft. Lauderdale, FL

Stephen Sideroff, Ph.D.
Jan. 19-20, 2002 - Marina del Rey, CA
April 13-14, 2002 - Ft. Lauderdale, FL

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Introduction to BioGraph Courses

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These courses are approved by the BCIA to provide 14 hours of Category A, accredited continuing education credit for BCIA recertification.

Participants will receive a certificate of completion from Thought Technology Ltd.

If you presently own the ProComp+/BioGraph system, it is recommended that you bring the complete system with a laptop computer to the course.

Please Note:
ProComp+ hardware, BioGraph software & laptops will not be provided.

Deadline for registration is two weeks prior to the course date.

Cancellations for any reason at any time will receive credit towards a future course less an administration fee of $50. Thought Technology reserves the right to cancel the course with full refund.
Introduction to BioGraph Workshops

Louise Marks  M.S., O.T.R.
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Jan. 24, 2003 - Sacramento, CA

Didier Combatalade, D.C.
Thought Technology Staff
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The new version 2.1 of the popular ProComp+/BioGraph multi-media biofeedback system opens a whole new universe of training possibilities. With a full range of multimedia and graphic tools to select from and over 32 pre-designed display screens that simulate arcade games, tell stories, and animate colorful designs, BioGraph now offers children and adults alike a large array of stimulating feedback environments, right out of the box!

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ProComp+/BioGraph offers two channels for EEG neurofeedback or EKG, and six other channels for the most popular biofeedback modalities: sEMG, temperature, skin conductance, heart rate/blood volume pulse and respiration.

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