Book Reviews

Evaluation of Clinical Biofeedback

W.J. Ray, J.M. Raczynski, T. Rogers, and W. Kimball
New York: Plenum Press, 1979. ix + 586 pp., $29.50

Biofeedback and Self-Regulation

Edited by Niels Birbaumer and H.D. Kimmell
New Jersey: Lawrence Earlbaum Associates, 1979. x + 469 pp., $29.95

Mind/Body Integration: Essential Readings in Biofeedback

Edited by Erik Peper, Sonia Ancoli, and Michele Quinn
New York: Plenum Press, 1979. xx + 586 pp., $25.00

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Never before has the laboratory and the clinic been so close as in the field of biofeedback. Born in the laboratory during the Zeitgeist of expanding consciousness, the findings and principles of biofeedback were rapidly applied to clinical settings. The attractive notion that one could exert control over "involuntary" bodily functioning intrigued the scientific community and gained enthusiastic acceptance among clinicians. In effect, the research laboratory had passed another milestone, and in the process given its counterpart, the applied psychologist, a clinical tool with which to "cure all ills." The bandwagon had started: biofeedback was studied intensely, and was also popularized.

Preliminary findings are all too often taken as fact before proven as fact, and biofeedback was no exception. Researchers experienced difficulty in replicating original work, throwing doubts on one's ability to control autonomic bodily processes. Yet in the clinic, biofeedback seemed to have met with moderate success. As a result laboratory research focused on each of the many variables involved in biofeedback. Important questions arose: what response is being reinforced, and what is learned in biofeedback training? Is awareness of the to-be-controlled response necessary? If so, can subjects and patients accurately

discriminate and describe variations in such responses?

Clinicians developed models of biofeedback as therapy while its applications became widespread. Biofeedback was used to treat cardiovascular, visceral, cortical, and muscular disorders. Each of the three books reviewed here pertains to an aspect of the laboratory-clinic interface of biofeedback. In *Evaluation of Clinical Biofeedback,* Ray, et al. focus on the effectiveness of biofeedback in the treatment of various types of clinical disorders. Birbaumer and Kimmel delineate the variables of biofeedback researched in the laboratory in their edited book, *Biofeedback and Self-Regulation.* Finally, results from both the laboratory and the clinic are highlighted in Peper, Ancoli, and Quinn's *Mind/Body Integration.*

In *Evaluation of Clinical Biofeedback,* Ray, et al. examine nearly all articles published between 1967 and 1977 that utilized biofeedback to eliminate or reduce clinical maladies. The authors' purpose is to present clinical biofeedback research from the perspective of a scientific evaluation. In an excellent introduction, the authors briefly review the two predominant models of clinical biofeedback: the learning theory model and the relaxation model. In choosing the evaluation criteria, special attention is given to the role of non-specific factors in biofeedback therapy. Three interacting factors are distinguished: therapist variables ("confidence in abilities and treatment"); patient variables ("expectancy for success"); and situational-procedural variables ("demand characteristics"). The evaluation criteria focus on (1) the role of biofeedback as the active agent in treatment; (2) the cost-effectiveness (psychological, physiological, medical, and financial) of biofeedback for a given disorder; and (3) the role of biofeedback in reconceptualizing the patient-doctor-disease relationship.

A total of 212 studies are organized and evaluated according to broadly defined disorder categories. One might be surprised to find that only one-third of the book is devoted to a narrative-type evaluation of biofeedback as an effective treatment modality. The remaining two-thirds of the book consists of outlines of the two-hundred plus experiments, organized in relation to the evaluation criteria established by the authors.

The breadth of disorders covered is wide, ranging from the common use of biofeedback in treating headaches, asthma, cardiovascular problems, anxiety and neuromuscular disorders to the more esoteric uses in treating hyperactive and learning-disabled children, speech, hearing, and reading disorders, sexual disorders, and dental disorders. Each global disorder category is divided into specific subtypes for assessment. The organization of evaluations is tight, including an introduction and summary for each of the general categorizations and specific types of

disorders. Methodological and conceptual factors involved in specific treatments are evaluated, as well as generalizability of treatment. However, the evaluation tends to be somewhat inconsistent, most times assessing an experiment or series of experiments in depth, but at other times being cursory.

The authors effectively appraise the numerous studies in relation to their first two evaluative criteria, but noticeably neglect the role of biofeedback in reconceptualizing the patient-disease relationship until the final summary. It is possible that this neglect is a reflection of the lack of consistent follow-up procedures utilized in the research. The authors, however, do little reconceptualization of their own on this matter.

After an overall summary, a brief list of disorders considered amendable to biofeedback therapy is presented. The remaining two-thirds of the book is devoted to the Appendix in which each of 212 clinical studies is outlined. Each outline contains brief information about subject demographics, treatment variables, results, follow-up procedures, and type of therapist involved in treatment. Some important issues are absent from the evaluation. The authors make no mention of personality variables (i.e., locus of control, introversion-extroversion) related to the efficacy of biofeedback treatment.

This book is quite readable and absorbing. The thoroughness of coverage is good, and the evaluations are sound. For the clinician who utilizes biofeedback as part of his/her therapeutic repetoire, this book is invaluable either as a reference book or as a resource for new treatment ideas.

Laboratory research aimed at the hows and whys of biofeedback makes up the bulk of Birbaumer and Kimmel's (Eds.) *Biofeedback and Self-Regulation.* This book is a compendium of thirty original articles, the fruits of an international conference on biofeedback held in West Germany during November of 1977. Edited by two old-hands in the field of biofeedback, this volume focuses on empirical research, and "encompasses the full range of current work...as well as indicating the most likely future directions..." (p. ix).

Selections are organized into three parts. The first two parts consist of empirical results of visceral conditioning, and the modification of cardiovascular and central nervous system processes, respectively. The third part contains research pertaining to the clinical implications of biofeedback. A short introduction sets the conceptual framework for each of the parts, which are organized into sections containing a number of chapters relating to a central theme.

Included in Part I are a number of sections aimed at identifying the mechanisms and methodological issues of visceral learning. Most notable

here is an excellent chapter by Gary Schwartz in which he puts forth his disregulation and systems theory as a framework for biofeedback and behavioral medicine. A pivotal point in Schwartz's chapter is that "the behavior of a system is due to the dynamic interaction of its parts" (p. 20). In order to understand the system (human being), one must understand the highly complex interactions between components of the system. Conceptual models such as this may prove highly useful not only in biofeedback research, but also in studying the mechanisms and interactions underlying the experience of consciousness.

Also included in this section are chapters examining the role of cognitive and emotional factors as possible mediators in modifying visceral functioning. Peter Lang's investigations of physiological responses produced by emotional mental imagery is fascinating, and has distinct implications for image-based therapies. In the human being, visceral functioning is not readily perceived and labelled except through biofeedback. Three chapters address the critical question regarding the necessity of awareness of responses in visceral control. The chapter by Brener, Ross, Baker, and Clemens points out that discrimination of organ functioning and control of its activities are interdependent processes, and support is provided for the relation between discrimination and control of cardiac activity.

Part II is a collection of three sections concerning the modification of cardiovascular and central nervous system functioning. Modification of these systems represents the most active research areas in biofeedback. In addition, the cardiovascular and central nervous systems have the greatest implications for clinical use. The first section contains chapters which present novel procedures for establishing cardiac control. For example, Kimmel and McCauley show that a continuous reinforcement procedure is effective in lowering heart rate. A chapter by Vaitl, Kenkmann, and Kuhmann demonstrates that feedback for heart rate stabilization allows for the detection of minute changes in heart rate control through respiratory techniques rather than verbal methods. The effects of social competition on feedback performance is presented in a chapter by Stegagno and Vaitl.

The second section focuses on the modification of EEG frequencies and their physiological as well as psychological concomitants. Zeier and Kocher's chapter shows that significant increases in the alpha rhythm (8-13 Hz) may be related to reduced arousal. In an intriguing chapter, Engstrom, Aaronson and Stryker used feedback to differentially shape EEG activity over two cortical areas: occipital alpha and temporal beta. Subjects increased temporal activity ($\geqslant 14$ Hz) while concomitantly maintaining low frequency ($\leqslant 10$ Hz) at the occipital cortex. Along the same lines, Beatty and O'Hanlon showed that EEG feedback for suppression

of posterior theta rhythm (4-8 Hz) enhanced attentional performance of a vigilance task, supporting the activation theory of sustained attention.

Central nervous system-cardiovascular interactions are the focus of the third section in Part II. The chapter by Bernard Engel exploits the naiveté of somatic mediation of heart rate. Engel maintains that heart rate is always neurally mediated. Certain physiological conditions, such as work load, somatomotor activity, and deviations in blood pressure and body temperature elicit neurally mediated changes in heart rate. Miller and Brucker, working with patients paralyzed by spinal lesions found that such patients were able to effectively exert instrumental control over blood pressure independent of changes in heart rate. The therapeutic implications are obvious.

As mentioned in the beginning of this review, laboratory discoveries in biofeedback have direct implications for the clinic. Part III of this book contains eight chapters on the clinical implications of biofeedback. The first of two sections deals with the use of biofeedback in reducing anxiety. In a chapter pertaining to the very important issue of generalizability of responses, Johann Stoyva favors the notion that specific EMG relaxation can be generalized to other muscle groups. However, he stresses the importance of the context (attitudes, setting) in which generalization may be achieved. Stoyva also points out generalization of relaxation to other bodily systems, and postulates possible mechanisms for these effects. The chapter by Reeves, Shapiro, and Cobb illustrates that learned heart rate changes have an effect on perception of pain during aversive stimulation. Pancheri, Crebelli, and Chairi demonstrated that EMG feedback was clinically effective for at least 50% of the patients treated for anxiety neuroses. The second section of Part III contains chapters examining the effectiveness of biofeedback in treating specific disorders, such as epilepsy, headaches, cardiophobic disorders, and rheumatoid arthritis.

The language of the material in this book is often technical, which occasionally makes for tedious reading. The organization of material is superb, and together the chapters form a cohesive line of thought. Each of the sections form an integrated, well-researched perspective of the field of biofeedback. Taken as a whole, the editors accomplish their purpose of presenting the latest developments and methods on key issues in biofeedback which will serve as models for future research. *Biofeedback and Self-Regulation* is a must for the sophisticated researcher who is interested in the nuts and bolts of biofeedback.

In *Mind/Body Integration: Essential Readings in Biofeedback,* Peper, Ancoli, and Quinn (Eds.) seek to reconnect the Cartesian separateness of mind and body through the relationship between physical and mental events brought to awareness in biofeedback. As noted in their introduc-

tion, the editors consider this book to be a readily available collection of biofeedback articles for use in teaching and learning. Indeed, the book may prove to be ideal for the undergraduate course in biofeedback. The more advanced biofeedback researcher, however, may find this collection somewhat rudimentary in the concepts and issues considered.

The overall coverage of the field of biofeedback is quite good, as the book adequately samples laboratory experiments, clinical applications, and theoretical perspectives. In addition, there are unique sections on the technical aspects of biofeedback as well as analogous techniques. This edited volume is mostly a collection of previously published articles, although it does contain some new material. The book is organized in nine sections, with each section containing a number of chapters on one aspect of biofeedback.

The first section is a general overview of biofeedback. A chapter by Shapiro and Surwit reviews the experimental basis of learned control and couples these results with various clinical applications ranging from hypertension to pain. The chapter by Schwartz, one of the few theoretical chapters, examines the crucial relationship between neurophysiological processes and their conscious experience and expression. Peper's chapter on passive attention highlights the importance of this cognitive style, but falls far short of doing it justice. This chapter appears to be more of a "how-to-do-it" than an actual investigation of passive attention. One must question the inclusion of an intriguing, yet controversial chapter on psychic healing and creativity by Green, Green, and Walters. The implications of psychic healing are certainly attractive, but are not generally considered essential reading in biofeedback.

The focus of Section II is on self-regulation techniques closely related to those of biofeedback, such as autogenic therapy and progressive relaxation training. Also included in this section are three chapters concerned with the critical issue of nonspecific factors involved in biofeedback. Beliefs, attitudes toward biofeedback, and placebo effects are all considered. Stroebel and Glueck present a much-needed model of placebo effects which obtains "an objective estimate of (1) current effectiveness, and (2) prediction of long term effectiveness of treatment" (p. 213). Such models are an essential step in understanding beliefs and expectancy factors in the healing arts.

Section III is another unique contribution of this book, and may indeed be considered essential reading. Biofeedback is only as good as its technology and instrumentation, and this section on the technical aspects of biofeedback may prove invaluable to the beginner. The six chapters in this section sample everything from electrode functioning to a glossary of bioelectric terms. Such information is essential in understanding the mechanics of biofeedback.

Each of the next five sections (Sections IV through VIII) deal with a specific area of biofeedback. The sections include: electroencephalography; electromyography; cardiovascular-temperature feedback; electrodermal feedback; and cardiovascular-hypertension biofeedback. Most of these sections contain chapters on physiological description, clinical applications, experimental studies, and recording and feedback techniques.

The final section of the book explores more esoteric uses of biofeedback, such as the treatment of bruxism and gastrointestinal disorders.

On the whole, this book is easy to read. However, it is uneven in scope and quality of analysis. The chapters vary widely in their level of importance; some are of high quality while others seem to be superficial. In addition, some of the material is outdated. Despite these shortcomings, this volume makes an excellent text for undergraduates.

The content of the three books reviewed here is just a sample of the exciting work taking place in the field of biofeedback. Critical issues are being explored and evaluated in the laboratory, with the results being applied to everyday problems and disorders so common to the clinic. It is through such marriages between the lab and the clinic that the frontiers of human psychology are constantly being advanced.