

DOCUMENT RESUME

ED 145 489

CS 501 852

AUTHOR
TITLE

Rohm, C.E.; Goyer, R.S.
Biofeedback and Communication: Perspectives and
Definitions.

PUB DATE
NOTE

77
13p.; Paper presented at the Annual Meeting of the
International Communication Association and
International Congress for Communication Sciences
(Berlin, Germany, May 29-June 4, 1977)

EDRS PRICE
DESCRIPTORS

MF-\$0.83 HC-\$1.67 Plus Postage.
*Behavioral Science Research; Communication (Thought
Transfer); *Communication Problems; Communication
Skills; *Feedback; *Models; Psychophysiology; *Self
Control; *Speech Communication; State of the Art
Reviews

IDENTIFIERS

*Biofeedback

ABSTRACT

This paper discusses the term "biofeedback" in its
historical context and relates it to behavioral research in speech
communication. The paper presents an operational model of the
communication process, suggesting that biofeedback techniques might
be used within the scope of the model to monitor, study, and
ultimately modify an individual's normal or dysfunctional speech
behaviors. A glossary and a list of references pertinent to the
biofeedback area are provided. (RL)

* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *

PERMISSION TO REPRODUCE THIS
MATERIAL HAS BEEN GRANTED BY

C. E. Rohm

R. S. Goyer

BIOFEEDBACK AND COMMUNICATION: PERSPECTIVES
AND DEFINITIONS**

THIS DOCUMENT HAS BEEN REPRO-
DUCED EXACTLY AS RECEIVED FROM
THE PERSON OR ORGANIZATION ORIGIN-
ATING IT. POINTS OF VIEW OR OPINIONS
STATED DO NOT NECESSARILY REPRESENT
OFFICIAL NATIONAL INSTITUTE OF
EDUCATION POSITION OR POLICY.

TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC) AND
USERS OF THE ERIC SYSTEM

C. E. Rohm and R. S. Goyer
Ohio University

I. Introduction

"Biofeedback," a term coined several years ago has become a subject of considerable fascination both to the general public and scientific community. What is it? What are its origins? How might it apply to research in human communicative behavior? Is it the faddish snake oil of modern medicine men, a technique of mystical revelation and self-control based on religious philosophies of the Far East, technological application of standard scientific principles of learning, or some combination of these?

Hailed as "the greatest single development in the history of psychology" and as "the newest, most exciting, and potentially farthest-reaching discovery ever to emerge from biomedical research" (Brown, 1977), biofeedback has not become the cure-all due to impossible expectations that have been raised (Melzack, 1975; Time, 1975). However, biofeedback techniques have received extensive coverage from virtually every major news medium.

Various universities and national governments have spent millions of dollars to finance research in biofeedback leading to reports of preliminary controls (cures) for a multitude of problems such as: anxiety, asthma, diabetes, epilepsy, insomnia, hyperactivity, hypertension, torticollis, phobias, stress, peptic ulcers, chronic pain, rheumatoid arthritis, muscle rehabilitation, tension and migraine headaches. With such an impressive list of medical and psychological references, perhaps conspicuous by its absence

**Prepared for the 27th Annual Conference of International Communication Association and International Congress for Communication Sciences. May 29 - June 4, 1977, Berlin, Germany.

ED145489

501 852

is any direct reference to either normal or dysfunctional communicative behaviors.

The purpose of this panel session is to orient and inform our listeners about the emerging era of biofeedback research. Some theoretical and pioneering research implications will be discussed along with possible applications across the broad spectrum of human communicational behavior.

The purpose of the present paper is to define and set in perspective the terms biofeedback and communication by identifying in broad strokes the historical forebears of the former term, and to provide in the printed copy of this paper a selected glossary of terms and a bibliography of references pertinent to inquiry in the biofeedback area.

II. Historical Background

For over 3,000 years the religious philosophies of the Hindu-Yogi and the Zen-Buddhists have claimed self-control over bodily functions. These Yogi and Zen masters have used various physical, psychological, spiritual and meditative methods to achieve their control (Bagchi and Wenger, 1957, Bagchi, 1969, Lesh, 1971). A modern version of yoga has emerged under the label of transcendental meditation - (TM), (Mahesh Yogi, 1969).

In the European countries, a different technique from Eastern mysticism was developed. Known as hypnotism, the method began in the 18th century and has continued until today (Waite, 1960). Sometimes referred to as "animal magnetism," hypnotism allows a person while in a trance-like state, to exercise control of bodily functions while under the influence of a hypnotist. A variation of the technique called auto-hypnosis or self-suggestion, produces a self-induced trance state to achieve the self-control (Schultz & Luthe, 1969).

In The United States, research at universities such as Harvard, Yale, Rockefeller, and Ohio has helped to pioneer still another method of self-control.

This method was developed by combining electronic technology and B. F. Skinner's Operant Conditioning principles first to animal studies and eventually to man (Budzynski & Stoyva, 1969; Miller, 1969; DiCara, 1970). Thus, the biofeedback technology and research resulted. It is a process which combines Far Eastern mysticism and Western technology, but without the influence of meditation, drugs, hypnotists or therapists. Specifically, it is a process that uses electrophysiological instrumentation to help a person learn self-control over specific bodily functions such as heart rate, blood pressure, muscle tension and others that were once thought to be involuntary. With the aid of electronic equipment, an individual can learn self-control by receiving continuous and instantaneous information about the body's biological functioning. Small electrodes (approximately a half inch in size) are taped to the body surface of the subject. The electrodes sense the amount of electrical activity of the desired bodily functions. This data is transmitted through wires to the monitor where it is displayed as a form of auditory and/or visual output.

III. Implications for Studying Communicative Behavior

Monitoring of the physiological processes of the body during the communicative event is not uncommon. In 1959, Clevenger reported on the state of the art concerning research in stage fright, including the measurement of sweat gland activity during stage fright. Stern and Lewis (1967) reported that actors could learn to control emotional expression with the use of the Galvanic Skin Response (GSR). Kohan (1968) suggested that the communicative effectiveness of advertising could be physiologically measured. Heart rate has been used as an index to stage fright and communicative apprehension (Behnke & Carlile, 1971; Porter, 1974). Fletcher (1973) implied that the GSR could add a new approach to the analysis of public communication. Gibb, Stephan and

Rohm (1975) suggested that muscle activity effected the performance of communicative ability. Emmert and Brook (1970) and Barker and Kibler (1971) included chapters in their anthologies concerning the monitoring of the physiological activity of the body. Although these references are not exhaustive, they do suggest that researchers in human communication have monitored bodily processes. However, these monitoring processes were not used to give continuous feedback to the communicators themselves, as in biofeedback techniques.

If one defines communication operationally as the sharing of experiences as evidenced by response behaviors, a minimum of five sequential ingredients are involved: (1) a generator of a (2) stimulus which is (3) projected to a (4) perceiver who (5) responds discriminately (assigns meaning). The basic units in the communicative process therefore can be represented simplistically by the model $G \xrightarrow{S} P^R$, where G represents the generator, S represents a stimulus, P represents a perceiver, R represents a differential response, and $\xrightarrow{\quad}$ represents projection in time (Goyer, 1970). In terms of this model, biofeedback techniques might be used to modify both normal and dysfunctional behaviors of the participants as they interact, as well as monitoring and ultimately controlling individual stress during intrapersonal data processing. Communicationologists have only recently begun to explore these phenomena using biofeedback techniques (Rohm, 1977). The research opportunities are manifold; more workers in the field are needed!

GLOSSARY

Afferent System: the system used for the transmission of neural impulses toward the central nervous system from sensory nerves that are projected in every portion of the body.

Altered States of Consciousness (ASC): a term associated with trances, hypnotism, dreams, ecstasy, and psychedelic experiences.

Anxiety: a physiological condition in which various bodily functions increase their activity (increase heart rate, muscle tension, breathing, glandular secretion, etc.) resulting from a psychological state of fearsome threat.

Auditory Feedback: the automatic presentation of a tone or an analog or digital basis signaling the degree of performance or non-performance of a behavior.

Autonomic Nervous System (ANS): a system that regulates the visceral functions of the body through the combined aspects of the central and peripheral nervous systems. It is usually divided into the sympathetic and parasympathetic divisions.

Biofeedback: a process that uses electrophysiological instrumentation to signal subjects learning to control voluntarily various bodily functions. The individual typically receives immediate information about the desired bodily processes until perceptual control is attained.

Biofeedback Society of America: an organization founded in 1968 which provides a forum for the exchange of ideas, methods and results of biofeedback and related studies. Its emphasis is primarily on scientific investigation of human behavior and human potential, both in basic and clinical settings.

Brainwaves: spontaneous fluctuations in the electrical activity of the brain.

The rhythmic fluctuations are named according to their frequency: alpha waves (between eight and thirteen HZ), delta waves (less than four HZ), and theta waves (between four and seven HZ).

Central Nervous System (CNS): a system composed of the brain and the spinal cord. The CNS serves two functions: (1) it interconnects the sensory receptors (afferent or input pathways) and the motor effectors (efferent or output pathways), and (2) it permits integration of the various sensory inputs and resulting motor efferents (Grossman, 1967).

Efferent System: the system used for the transmission of neural impulses from the central nervous system to the muscles and glands (peripheral effectors).

Electrocardiograph (EKG): an instrument for recording the potential of the electrical currents that traverse the heart and initiate its contraction (Stedman, 1972).

Nervous System: all the organs of the body that are composed of nerve tissues; the combination of the Central Nervous System and the Peripheral Nervous System.

Peripheral Nervous System (PNS): the system composed of the nerves, ganglia and end organs which connect the Central Nervous System with all the other parts of the body. It translates changes in the physical energy in the internal or external environment into neural impulses which can be used by the CNS to produce overt response to the environment (Grossman, 1967).

Placebo Effect: a measurable change in a subject's physiological functioning induced as a result of the subject's psychological expectations, rather than the alteration of physical variables.

Psychogalvanometer: a device for measuring electrodermal response; a "lie detector".

Psychophysiology: a branch of psychology concerned with research in which the dependent variables is a physiological measure and the independent variable is a "behavioral" one. "Physiological psychology" deals with the manipulation of physiological variables and the recording of behavioral events which "psychophysiology" deals with the manipulation of behavioral events and the recording of physiological variables (Stern, 1964).

Visceral: pertaining to any organ or activity inside the body wall regulated by the sympathetic and parasympathetic portions of the Autonomic Nervous System.

Visual Feedback: the automatic presentation of a light on an analog or digital basis signaling the degree of performance or non-performance of a behavior.

REFERENCES

- Bagchi, B. K. Mysticism and mist in India; Journal of the American Society of Psychosomatic Dentistry and Medicine, 1969, 16, 1-32.
- Bagchi, B. K., & Wenger, M. A. Electro-physiological correlates of some yogi exercises. EEG and Clinical Neurophysiology, 1957, Supplement 7.
- Barker, L. L., & Kibler, R. J. (Eds.). Speech Communication Behavior: Perspectives and Principles. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1971.
- Behnke, R. R., & Carlile, L. W. Heart rate as an index of speech anxiety. Speech Monographs, 1971, 38, 65-69.
- Bode, D. L., & Brutten, E. J. A palmar sweat investigation of the effect of audience variation upon stage fright. Speech Monographs, 1963, 30, 93-96.
- Brown, B. B. Stress and the Art of Biofeedback. New York: Harper & Row, Publishers, 1977.
- Budzynski, T. H., & Stoyva, J. M. An instrument for producing deep muscle relaxation by means of analog information feedback. Journal of Applied Behavior Analysis, 1969, 2, 231-237.
- Clevenger, T. A synthesis of experimental research in stage fright. Quarterly Journal of Speech, 1969, 45, 134-145.
- Emmert, P., & Brooks, W. D. Methods of Research in Communication. New York: Houghton Mifflin Co., 1970.
- Fletcher, J. E. Old time GSR and a new approach to the analysis of public communication. Quarterly Journal of Speech, 1973, 59, 52-60.
- Gibb, J. D., Stephan, E., & Rohm, C. E. T. Belief in biofeedback for the control of short-term stress. Behavioral Engineering, 1975, 2, 80-83.
- Goyer, R. S. Communication, communicative process, meaning: toward a unified theory. The Journal of Communication, 1970, 20, 4-16.
- Grossman, P. A Textbook of Physiological Psychology. New York: John Wiley &

Sons, Inc., 1967.

Kohan, X. A physiological measure of commercial effectiveness. Journal of Advertising Research, 1968, 8, 46-48.

Lesh, T. V. Zen Meditation and the development of empathy in counselors.

In T. Barber, L. V. DiCara, J. Kamiya, N. E. Miller, D. Shapiro, & J. Stoyva (Eds.), Biofeedback and Self-Control: An Aldine Annual on the Bodily Processes and Consciousness, 1970. Chicago: Aldine Atherton, Inc., 1971.

Mahesh Yogi, M. On the Bhagavad-Gita: A New Translation and Commentary.

Baltimore: Penguin Books, Inc., 1969.

Melzack, R. The promise of biofeedback: don't hold the party yet. Psychology Today, 1975, (July), 18-20.

Miller, N. E. Learning of visceral and glandular responses. Science, 1969, 163, 434-445.

Porter, D. T. Self-report scales of communication apprehension and autonomic arousal (heart rate). Speech Monographs, 1974, 41, 267-276.

Rohm, C. E. T. The effects of electromyographic biofeedback procedures on verbal decision-making behavior. Forthcoming, 1977.

Schultz, J. H., & Luthe, W. Autogenic Methods (Vol. 1). New York: Green and Shatton, 1969.

Stedman (ed.). Stedman's Medical Dictionary (23rd ed.). Baltimore: The Williams and Wilkins Company, 1972.

Stern, J. A. Towards a definition of psychophysiology. Psychophysiology, 1964, 1, 90-91.

Stern, R. M., & Lewis, N. L. Ability of actors to control their GSRs and express emotions. In T. Barber, L. V. DiCara, J. Kamiya, N. E. Miller, D. Shapiro, & J. Stoyva (Eds.), Biofeedback and Self-Control: An Aldine Reader on the

Bodily Processes and Consciousness. Chicago: Aldine-Atherton, Inc., 1971.

Time, No Deux ex machina. Time, 1975, (December 8), 57-58.

Waite, A. E. Braid on Hypnotism: The Beginning of Modern Hypnosis (Rev. Ed.).

New York: The Jubican Press, Inc., 1960.

SELECTED BIBLIOGRAPHYArticles

Brown, B. B. Biofeedback: an exercise in self-control. Saturday Review, 1975, 204, 22-26.

Budzynski, T. H. Biofeedback procedures in the clinic. Seminars in Psychiatry, 1973, 5, 537-547.

Harris, A. H., & Brady, J. V. Animal learning-visceral and autonomic conditioning. Annual Review of Psychology, 1974, 25, 107-133.

Rohm, C. E., T., Gibb, J. D., & Sorenson, R. Biofeedback and temperature training and speaking. Biofeedback and Self-Regulation, 1976, 1, 350-351.

Schwartz, G. E. Biofeedback as therapy: some theoretical and practical issues. American Psychologist, 1973, 28, 666-673.

Shapiro, D. A monologue on biofeedback and psychophysiology. Psychophysiology, 1977, 14, 213-227.

Books

Barber, T., DiCara, L. V., Miller, N. E., Shapiro, L., & Stoyka, J. (Eds.).

Biofeedback and Self-Control: An Aldine Annual on the Regulation of Bodily Processes and Consciousness, 1970. Chicago: Aldine-Atherton, Inc., 1971.

Barber, T., DiCara, L. V., Miller, N. E., Shapiro, L., & Stoyka, J. (Eds.).

Biofeedback and Self-Control: An Aldine Reader on the Regulation of Bodily Processes and Consciousness. Chicago: Aldine-Atherton, Inc., 1971.

Beatty, J., & Legewie, H. Biofeedback and Behavior, (NATO Conference Series, Series III: Human Factors, Volume 2). New York: Plenum Publishing Corporation, 1977.

Brown, B. B. New Mind, New Body Biofeedback: New Directions for the Mind.

New York: Harper & Row Publishers, 1974.

Brown, B. B. The Biofeedback Syllabus: A Handbook for the Psychophysiologic Study of Biofeedback. Springfield, Illinois: Charles C. Thomas Publisher, 1975.

DiCara, L. V., Barber, T. X., Kamiya, J., Miller, N. E., Shapiro, D., & Stoyna, J. (Eds.). Biofeedback and Self-Control: An Aldine Annual on the Regulation of Bodily Processes and Consciousness, 1974. Chicago: Aldine Publishing Co., 1975.

Greenfield, N. S., & Sternbach, R. A. (Eds.). Handbook of Psychophysiology. New York: Holt, Rinehart and Winston, Inc., 1972.

Miller, N. E., Barber, T. X., DiCara, L. V., Kamiya, J., Shapiro, D., & Stoyna, J. (Eds.). Biofeedback and Self-Control: An Aldine Annual on the Regulation of Bodily Processes and Consciousness, 1973. Chicago: Aldine Publishing Co., 1974.

Shapiro, D., Barber, T. X., DiCara, L. V., Kamiya, J., Miller, N. E., & Stoyna, J. (Eds.). Biofeedback and Self-Control: An Aldine Annual on the Regulation of Bodily Processes and Consciousness, 1972. Chicago: Aldine Publishing Co., 1973.