Commentary: Refections on Neurotherapy: Past, Present and Future

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People tend to remember throughout their lives exactly where they were when some event of special importance to them occurred. That is true in my case for the first time I heard of what is now generally referred to as neurotherapy. It was 1969, the "Age of Aquarius" was dawning and I was a new Ph.D. psychologist at Polk Center in Pennsylvania, a state residential center for persons diagnosed as mentally retarded. Since having read an article by T.C. Kahn (1954) on rhythmic sensory stimulation, and having been involved in research on the Doman "neurological organization" and rhythmic "patterning" approach to treatment of brain injury (Doman & Delacato, 1960), I had been very interested in potential therapeutic effects of rhythmic sensory stimulation. And, I had read a recent news magazine article stating that, according to their parents, some children frequenting the Electric Circus establishment in New York City where they were exposed to psychedelic music had unexpected improvements in school grades. Since psychedelic music referred to music accompanied by lights changing in color and intensity with changes in frequency, volume and rhythm, I speculated that some sort of favorable entrainment of brain electrical activity might be occurring--perhaps bringing neural order (since music is organized sound) and/or greater synchrony among central auditory and visual processing systems. It seemed logical that such synchrony might facilitate the visual-auditory integration processes occurring during normal reading. In pursuit of these ideas, I placed a phone call to New York University, and was put in contact with Dr. Edgar Coons. As I recall, he had heard of the improved grades/psychedelic music relationship: however, he said "I bet you would be interested in something Joe Kamiya recently has reported--that with proper feedback people can learn conscious control of their brainwaves". I was, indeed, interested. At the time this seemed to me to be one of the greatest discoveries ever, and one which surely would revolutionize practices in medicine, education, and psychology. After all, I thought, entraining brain activity through rhythmic, multiple simultaneous sensory stimulation might be effective, but how much more "democratic", and perhaps enduring, brain changes would be if under learned voluntary control. However, since biofeedback equipment was not available, I proceeded to try to research effects on behavior of rhythmic sensory stimulation. Some of my supervisors felt this was too "far out" (even for 1969) and, fearing seizures in subjects, insisted the study be limited to a very few severely retarded persons. While some positive behavior changes were noted and reported at a professional

conference (Evans, 1972), much credit for these was taken by behavior modification specialists working concurrently with the subjects.

After a couple of years I assumed my present position at the University of South Carolina. The interest in EEG biofeedback continued, and during a 1970s sabbatical I completed an interdisciplinary internship at Langly Porter Neuropsychiatric Institute where I took a biofeedback course from Joe Kamiya. I had fully intended to secure a federal grant and engage in biofeedback research upon my return to the University. However, to my chagrin, I discovered by then the field of scientific psychology had more or less dismissed biofeedback, and considered it unworthy of major research effort. With pressing needs to get on with academic life (tenure, raises) I moved in other directions and essentially dropped out of the biofeedback field for about 20 years.

For many readers (especially those born before 1950), much of the above likely will sound familiar. Many have followed very similar paths: great excitement about the promise of learning voluntary control of the EEG, warning of the potential dangers in doing so, statements that positive results must have been due to other "proven" methods or to placebo effects, and disappointment in the decline of interest shown by mainstream medicine and psychology. Biofeedback practioners are well aware of this rise and fall of EEG biofeedback and have attributed it to various forces, a main one being that it was embraced by, and became too closely associated with "flower children" and "new age" ideas regarding expanding consciousness. That undoubtedly was a major factor, but for many persons it was a few reports in prestigious journals (e.g. Rlotkin, 1979) that EEG biofeedback does not produce or is not necessary to produce significant EEG changes which led to its premature dismissal by much of the scientific community.

Fortunately, there are a few "believers" who continued to pursue the field, and kept it alive until the major revival of interest we are enjoying in the 1990s. Joel and Judith Lubar at the University of Tennessee and Lester Fehmi of Princton come to mind as three of these pioneers with whom I had occasional contact during the "dark ages" of EEG biofeedback. Today it is common to attribute the relatively sudden revival of interest to the published research of persons such as the Lubar's, Barry Sterman, Eugene Peniston, and Paul Kulkosky. While this is true, much of the renewed interest surely has depended on the relatively recent availability of reliable, affordable

equipment for which we are indebted to companies such as Autogenics, Inc. and Lexicor Medical Technology, Inc.

And now my reflections lead us to the present where, at least within the general field of biofeedback, EEG biofeedback again is enjoying popularity generally under the "new" titles of neurofeedback or neurotherapy. As I understand it, a sort of revolution has occurred in which neurotherapy when from outcast status in the broader biofeedback field to major player, potentially in position to "wag the dog". In many respects, the field is being given a second chance to prove that its 1969 promise was valid after all. Will we be able this time to maintain momentum until neurotherapy gains credibility with the scientific, medical and psychological communities, insurance providers and the general public? In the following paragraphs I will state two questions I believe need to be asked, and then speculate on how one might best answer each in order that the answer to that larger question will be "yes".

First, one may ask "Why did we, do we and should we in this field consider neurotherapy to be so special? After all, it has much competition among what have been termed "alternative therapies". Why should some of us consider it more promising than, for example, acupuncture, music therapy, massage therapy or eye movement desensitization and reorientation (EDMR)? To answer this, I consider the critical roles of rhythm and the central nervous system in life. Rhythm pervades all of life, e.g., the seasons, the day/night cycle, breathing, heartbeats. As noted by Ayensu and Whitfield (1981) "rhythm sets the pace for all creation", and "to have life is to have rhythm". The central nervous system controls (or mediates) sensation, perception, emotion, volition, and consciousness and has its own rhythms, including those constituting the EEG. These rhythms surely are very closely related to functioning and dysfunctioning of such processes; and normalizing or optimizing their quality through neurotherapy should hold great promise for normalizing or optimizing these processes and related behaviors. We readily acknowledge that neural transmission in electrochemical in nature and that modifying brain chemistry through psychoactive medications can modify those processes; so why not expect similar effects from self-modification of brain electrophysiology?

Interestingly, rhythm is intimately involved in a great many, if not most, other alternative therapies. Music therapy and jogging are obvious examples.

However, in many cases the rhythm is passively imposed and may only temporarily and indirectly entrain internal processes, whereas neurofeedback involves active learning of direct control of what are arguably the most central of all biological rhythms--those of the central nervous system.

A second question to entertain is "What are the 'pitfalls' we should attempt to avoid?" Some would say we need to avoid unduly close association with "new age" thinking and practice. This, however, is a rather nebulous term, and likely means very different things to research scientists, medical practioners, religious leaders and the general public. Some persons who describe themselves as scientists refer to new age proponents as "wide eyed, sloppy thinking, pseudo intellectuals" who speak vaguely of "energies," and who latch on to bits of information from medical or psychological research and naively jump to conclusions about their therapeutic value. And, from the perspective of some religions, new age thinking places too much emphasis on the power of the individual mind as opposed to that of a deity, and may make persons vulnerable to satanic influences. Obviously, a strong association of neurotherapy with such beliefs could be an encumbrance to the field.

I suspect that another pitfall to avoid is excessive internecine warfare. While this may be inevitable, and perhaps even desirable to some extent in a rapidly growing discipline, it could impede efforts to being credibility to the field. At neurotherapy-related meetings one regularly hears of pirating of ideas, and scoffing at others' theories of the dynamics of neurotherapy, best practices, etc. The latter especially must seem ludicrous to many of those outside the field who do not even accept neurotherapy as a viable treatment modality at this time. And even within the field some consider such squabbling to be premature and inappropriate given the very limited (albeit rapidly growing) scientific knowledge of brain-behavior relationships and human electrophysiology. Related to this, we need to avoid making excessive claims about any neurotherapy practices without research data to back the, in this regard, I am reminded of a remark I heard at a biofeedback conference where a workshop participant asked a presenter whether by next year he would be able to "raise people from the dead"!

A final danger relates to the question of who is qualified to practice neurofeedback. Most of us in this field obviously believe(and many are demonstrating) that neurotherapy can be very effective in treating a wide variety of disorders. Yet most anyone can purchase EEG biofeedback

equipment, and there are relatively few states with laws regarding who can provide treatment with it. To the degree that we condone this we appear to be saying that this is a safe, simple and highly effective treatment for a wide variety of disorders which previously were considered complex and safely treated only by licensed physicians, psychologists and other mental health workers. At best this strains credibility and invites ridicule, and at worst harms clients and could lead to restriction of neurotherapy to medical practioners or to very rigid medical supervision. While it appears to be true that neurotherapy is a safe treatment modality with very few side effects, its indiscriminate use could be very dangerous. This is especially true if it is used without close interdisciplinary collaboration, and/or to the exclusion of more established procedures when they are called for. Steps which have been taken to address this situation, such as the neurotherapy certification available to qualified professionals through the Biofeedback Certification Institute of America, certainly are moves in the right direction. Whether certain certification standards are too lax and whether another certification group with higher standards is needed to increase credibility among other professional currently is being hotly debated. Although some argue that having two certification groups would divide the field at a time when we need strength in numbers, others argue that a second certification group would provide healthy competition, and that, in any event, the field already is divided over this question of qualifications needed to practice neurofeedback.

In the remainder of this editorial I reflect on what might be done (or continue to be developed) to help ensure continued and expanded acceptance of neurotherapy.

I believe most readers will agree that one of the major ways to avoid (or shed) negative connotations of neurotherapy by mainstream medicine, psychology and other professions is to conduct well controlled research and publish results. Of course, this is much easier said than done given that high quality research is expensive and time-consuming, and most present advocates of neurotherapy are clinicians with little time for such research. Furthermore, many believe that federal funding agencies are unlikely to consider neurotherapy sufficiently credible to award research grants to attempt to demonstrate its value. Nevertheless, perhaps one should not be too pessimistic on this latter point. The dramatic rise in numbers of neurotherapy practioners, and the increasing reports in the literature of therapeutic success with individuals and small groups should soon attract the attention of research granting agencies. I suspect the time is getting "ripe" for federal funding of a well-formulated neurotherapy research

proposal. In the meantime there is a major need to continue increasing the visibility of neurofeedback through publications of clinical and small group research findings in a variety of journals. Establishment of the Journal of Neurotherapy certainly was a major step in this direction, and now that it is abstracted through the American Psychological Association's "Psych Lit", its potential for facilitating widespread positive visibility of neurotherapy is greatly increased. The Journal's policy of returning copyrights to authors can be a major help to the field because it allows the authors to submit their original manuscripts (or some modifications of it) to other professional journals, thus ensuring an even broader audience.

Establishment of the Society for the Study of Neuronal Regulation (SSNR) and the EEG Biofeeback Division of the Association for Applied Psychophysiology and Biofeeback (AAPB) are other major developments which increases the visibility of neurotherapy. As membership grows and quality of conference presentations continues to increase, this should increase acceptance of the field's scientific underpinnings and the clinical efficacy of this treatment modality. Some lament the establishment of two different professional neurotherapy groups, considering this to be unduly devise. However, considering the major controversies which exist regarding details of "best practices" in neurotherapy, there already is a lack of a united front. Competition between groups may spur research to "prove" one particular view or the other, thereby facilitating evolution of the field.

A need exists for a single source of information on neurotherapy and related topics which presently is available only through diverse sources such as proceedings of conferences, scattered journal articles and information downloaded from the internet. Andrew Abarbanel and I hope to help fill this gap with an edited book tentatively entitled Introduction to Quantitative EEG and Neurofeedback which is expected to be published later in 1998 by Academic Press. This book describes central concepts of QEEG and neurotherapy, samples the neurotherapy experiences of several "pioneers" in the field (and some relative "newcomers") regarding results with various disorders, and provides several viewpoints on the dynamics of neurotherapy. It should serve as foundation reading for persons interested in becoming certified neurotherapists as well as provide an integrative review for those already in the field.

Causal observations of persons attending neurofeedback-related conferences (such as SSNR) reveals a preponderance of middle-aged persons, presumably many of us who became interested in EEG biofeedback when it was perceived as new and promising in the 1970s. A relative lack of younger persons may be due in large part to a persisting view among some university professors and others who mentor young people that biofeedback in general, or neurotherapy in particular, lacks credibility and efficacy. In discussing this situation with one young conference attendee, he commented that his academic advisor had warned him to stay out of the EEG Biofeedback field; that it is a "dead end" field, and to stay in it would encumber his professional growth and development. Such attitudes, of course, may change as results of research favorable to neurotherapy are published and presented at scientific conferences, and/or as insurance companies and health maintenance organizations accept neurofeedback as a reimbursable treatment modality. Those of us with academic affiliations could help overcome such bias and expedite awareness and acceptance of the field by introducing special graduate level courses on neurotherapy and related topics, or by inserting these topics in sections of already established courses on therapeutic techniques.

Another area where, in my opinion, neurotherapy should be greatly expanded is in work with children, including pre-school aged children. Not only would widespread use of neurotherapy with children, help guarantee future awareness of the technique, it could serve as a major means of prevention of later disorders. This certainly is not a new idea, but one which is deserving of special attention in view of research findings regarding basic causes of a wide variety of psychiatric type disorders. Following recent reading of an edited text on child psychopathology (Mash & Barkley, 1996), I was struck by the number of times different authors mentioned evidence for physiological disregulation (especially autonomic disregulation), lack of a sense of self-control (lack of internal locus of control) and lack of adequate awareness and differentiation among internal sensations as probable basic causes of psychiatric type disorders in children and adults. I cannot think of a better way to learn a sense of self control than though controlling one's physiological processes through biofeedback. And, one would be learning simultaneously to perceive find differences in internal sensations as well as bringing greater regularity to the process being trained. Neurofeedback may be the most valuable of the biofeedback modalities in this regard since, as noted earlier, the regularities (rhythms) of the central nervous system may be basic to all other body rhythms. Additionally, several authors related abuse and other trauma of childhood to later psychopathology. If the view commonly held by neurotherapists that the alpha-theta training protocol permits addressing

and resolving early trauma-related memories, this should be yet another reason to expand use of neurofeedback with children (as well as adults).

These are exciting times for neurotherapy, and it has been good to have been, and to be, a small part of its history. I believe the field now has a new open window of opportunity to prove that neurotherapy can be the revolutionary prevention and treatment modality many of us perceived it to be three decades ago. Let's do it!!

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