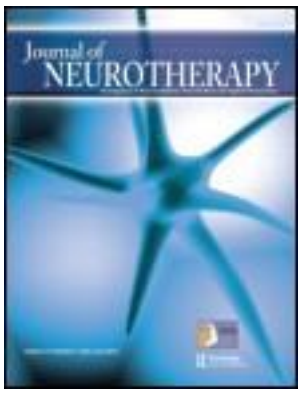


Journal of Neurotherapy: Investigations in Neuromodulation, Neurofeedback and Applied Neuroscience

Thomas Budzynski

Robert Grove [a]

[a] Redondo Beach , California, USA

Published online: 20 May 2011.

To cite this article: Robert Grove (2011) Thomas Budzynski, Journal of Neurotherapy: Investigations in Neuromodulation, Neurofeedback and Applied Neuroscience, 15:2, 182-186, DOI: 10.1080/10874208.2011.570687

To link to this article: http://dx.doi.org/10.1080/10874208.2011.570687

PLEASE SCROLL DOWN FOR ARTICLE

© International Society for Neurofeedback and Research (ISNR), all rights reserved. This article (the "Article") may be accessed online from ISNR at no charge. The Article may be viewed online, stored in electronic or physical form, or archived for research, teaching, and private study purposes. The Article may be archived in public libraries or university libraries at the direction of said public library or university library. Any other reproduction of the Article for redistribution, sale, resale, loan, sublicensing, systematic supply, or other distribution, including both physical and electronic reproduction for such purposes, is expressly forbidden. Preparing or reproducing derivative works of this article is expressly forbidden. ISNR makes no representation or warranty as to the accuracy or completeness of any content in the Article. From 1995 to 2013 the *Journal of Neurotherapy* was the official publication of ISNR (www. Isnr.org); on April 27, 2016 ISNR acquired the journal from Taylor & Francis Group, LLC. In 2014, ISNR established its official open-access journal *NeuroRegulation* (ISSN: 2373-0587; www.neuroregulation.org).

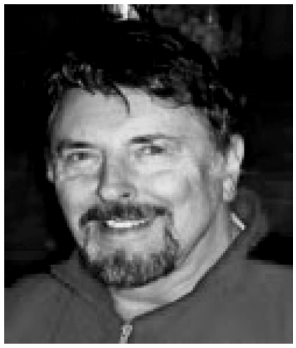
THIS OPEN-ACCESS CONTENT MADE POSSIBLE BY THESE GENEROUS SPONSORS

Journal of Neurotherapy, 15:182–186, 2011
Copyright © 2011 ISNR. All rights reserved.
ISSN: 1087-4208 print/1530-017X online
DOI: 10.1080/10874208.2011.570687

Routledge
Taylor & Francis Group

OBITUARY
THOMAS BUDZYNSKI

Robert Grove
Redondo Beach, California, USA



Thomas Budzynski, PhD, BCB, BCN Emeritus, died of a heart attack at home early morning on Valentine's Day, February 14, 2011. He was 77. He was a gifted teacher, researcher, and friend. His career crossed many areas. For those of you who are unfamiliar with the early days of biofeedback, Tom was unique in his ability to bring together innovative technology, solid engineering, and academic research credentials while maintaining interest in both peripheral and EEG biofeedback. In short, he was the perfect person to represent the best science for these emerging fields. In the early days before biofeedback, several researchers in the 1950s and 1960s independently explored ways of recording and training bioelectric signals underlying muscle activity levels. A Canadian physician, John Basmajjian, MD (1962), independently published *Muscles Alive: Their Functions Revealed by Electromyography*, wherein he described operant conditioning of single muscle fiber activity using needle electrodes in humans. ''Feedback'' involved viewing an oscilloscope display of raw filtered muscle activity, hearing the raw sound of bipolar EMG signals, and voluntarily changing it. The precision and control shown by his students with just myofeedback was astonishing. In the late 1960s in New York, Bernard Brucker, PhD, independently started similar laboratory work on EMG training and began to successfully condition alternative pathways in stroke-damaged muscles. His direction was a bit different. He focused on poststroke rehabilitation and muscle fibers.

Whereas most researchers at that time used existing equipment and focused on raw signals from single muscle fibers, Tom took a much different route, a route that helped broaden the audience for a new clinical specialty, biofeedback. As an electrical engineer, this route was a natural for him.

In 1957, Tom had earned a Bachelor of Science in Electrical Engineering at the University of Detroit and worked for NASA in Cleveland, Ohio. He moved to California and worked at Northrop and Hughes Aircraft. After that, at Honeywell, he worked as an aerospace inertial guidance systems engineer. He was very proud of his work on the inertial guidance system used first on the SR-71 Blackbird, a prototype, and saw it through to its first flight. This system involved the use of electronic feedback circuits with auto-correction and a form of signal detection. This knowledge would serve him well as he switched to the study of psychology in the early sixties.

He was a graduate student at the University of Colorado. Then, in 1964 Tom briefly

Received 1 March 2011; accepted 5 March 2011.
Address correspondence to Robert Grove, PhD, 220 Marina Way #35, Redondo Beach, CA 90277, USA. E-mail: drgrove@gmail.com

returned to California as a research associate in the Psychology Department at University of California, Los Angeles (UCLA). While at UCLA he built and tested a special tape recorder for group processes. During this time, he and John Picchiottino, an outside engineer, coengineered a novel surface EMG biofeedback device. John and Tom continued to work on special projects when Tom returned to Colorado as a Postdoctoral Fellow.

This EMG devise was quit innovative. Up to that point, EMG was done with depth electrodes; surface EMG was still very crude. However, Tom read that work in England had developed a novel way of continuously monitoring an averaged rectified EMG signal from surface electrodes. So, working with his friend John Picchiottino, Tom engineered a similar circuit. Then he got creative. Rather than using a meter to feed back EMG information, he put in a ''tri-light,'' a red–yellow–green light display. Rather than using the raw EMG signal as a sound, he engineered a special click sound that went slower as amplitude dropped. These click audio sounds allowed monitoring without looking at the display. Most important, they amplified the signal so that very small changes had big effects. This was revolutionary technology.

Using this device, he discovered that if a person learns to sustain very low levels of forehead muscle tension a more generalized relaxation effect occurs involving the autonomic nervous system. So calming the frontalis muscle calmed the autonomic nervous system as well. This is obvious today, but it was revolutionary in 1969. Budzynski used the calming effect clinically to combat anxiety and stress.

Surface EMG feedback studies took off. ''Biofeedback'' was now in vogue. The term had just been coined by Weiner's ''feedback'' at the Biofeedback Research Society meeting in 1969. Subsequently, Tom served as president of the Biofeedback Research Society in 1974 and became an important spokesman for the emerging field. Tom's career skyrocketed. Biofeedback was new, and the demand for training was immense, both here and abroad.

Tom was also interested in EEG and brain–behavior issues. Again, with the assistance of John Pichottino, he developed one of the first practical EEG neurotherapy devices. (This device was not the Twilight Learner.) Tom reported that he was doing preliminary EEG neurofeedback studies in 1966. He now learned of Joe Kamiya's work in California on alpha brain wave feedback and felt his machine could be used to duplicate and extend Kamiya's work. But Budzynski was more interested in theta waves. His work (1976) documented that theta brain waves could also be modified with feedback.

This occurred at a time when affirmations were a big topic for authors of self-help books. Tom was both amused and alarmed by the proliferation of self-help books preaching self-affirmation to modify behavior. Although good intentioned, there was no discussion of the real problem: In a normal waking brain state, the fully alert person has built-in defenses that are highly self-protective (defense mechanisms). What was missing was some way of getting around this natural, self-defensive blocking of positive affirmations. Research had already shown that, in normal awake states, affirmations were not reliable for modifying habits.

Tom would joke to his friends that he moved from understanding one defense system—aerospace—to understanding another defense system, inner space. Inner space was more difficult. He looked for a multitude of ways to put the brain in a twilight state between waking and sleeping and studied which techniques, if any, were most effective. He named this category of techniques Twilight Learning.

A simple form of Twilight Learning was to go over affirmations when drowsy, just before sleep, and at waking. In an article in the popular magazine *Psychology Today* in August 1977, he set forth a new way of thinking about this whole arena (Budzynski, 1977). He knew of Sperry's (1964) work on neuropsychological changes in epileptics after their hemispheres were sectioned and was in contact with Sperry's student, Jeri Levy.

Basically, Tom drew on Sperry's discoveries, relating them to brain lateralization of emotions. Although subsequent work found more variability in lateralization, which Tom later incorporated, at the time he basically concluded that emotional defense mechanisms were due primarily to the dominance of the left (''logical'') hemisphere in the awake state. He postulated that the right hemisphere functions were more accepting and that they were mostly inhibited in the awake state. This psychological concept was old-hat to psychoanalysts, but the corresponding aspect of brain function lateralization was groundbreaking. Tom's inspiration would later be considered as an aspect of neuroscience, citing many studies that showed how physiological arousal altered memory and recall, evidenced by state-dependent learning studies.

Twilight Learning grew out of his curiosity about finding simpler ways to help people relax or sleep. The idea was simple: Use the tapes every day, and use feedback to verify or fine-tune responses. As a result, The Relaxation Training Program, a series of relaxation tapes, was produced in the 70 s. The tapes were developed from a neurofeedback program to help soldiers sleep on the battlefield. Soldiers first learned to produce alpha waves, and then theta waves. Again, this is still not the Twilight Learner; that came later. Nevertheless, the relaxation tapes and two-stage neurofeedback training helped get soldiers into Stage 1 sleep in 20 min. They were then assigned the tapes alone, with great success. His latest exercise, The Revitalizer Tape, a 12-min practice, was now available in many audio formats. Why 12 min? He found that 12 min was about the maximum amount of time that could be tolerated by most Americans.

Finally, in 1970, Tom and John Picchiottino constructed the Twilight Learner. The Twilight Learner, a special neurotherapy device, was used to provide preprogrammed affirmations in a high-amplitude theta state. The Twilight Learner used pink noise to help calm and increase theta. Although theta levels were high, a tape recorder automatically turned on taped affirmations. If theta went too high, subjects could drift into sleep, so the volume was automatically bumped up to arouse them. Unfortunately, very few people attained a Twilight Learner, as it was never produced beyond the first models.

Tom explored other potential solutions to avoid awake, critical screening. Among them were priming process (a form of subliminal messaging), dichotic listening, multiple voice tracks, whisper tracks, and hypnotic/priming combinations. Each provides messages designed to be understood by the respective hemisphere in which it is presented. Tom spent hours testing words and phrases, trying to find the best combinations for his experiments.

He remained interested in brain lateralization experiments. Dichotic listening involved flooding the dominant ear with talk or sound while pulsing messages to the nondominant ear. Subliminal messages were most intriguing. He published his results on these procedures, and was surprised to find himself in the middle of a major debate. Rather than receiving accolades, Tom, along with Paul Swingle and other researchers, were loudly criticized by other psychologists for exploring these areas in a presumably nonscientific way. A few people stood by him. Paul remembers these events vividly:

> Tom wrote the endorsement for my 1992 book on subliminal treatment [Swingle, 1992] and did some assessments on one of my subliminal harmonics that is still widely used today. Tom and I also weathered the outrages of the righteous who had a vendetta for any of us who dared to objectively explore the efficacy of subliminal stimulation. The attacks on us at the time were quite hilarious and often took place in the ''scientific'' forums of institutions, such as the APA. It was easy to get negative results published in the journals indicating that subliminal stimulation was not effective, and impossible to get positive findings reported. The research designs of the former were so naive that I would have flunked any student who presented such a project in my courses

> on research design. For example, naysayers would get subliminal tapes that were advertised in pulp magazines and then test them on clients. They could not understand that the independent variable they were investigating was ''a tape from Hustler magazine'' without any subliminal parameters. The APA charged Lee Pulos, a mutual friend of Tom and me, with an ethical violation for using subliminal messages with cancer patients (he did so free of charge by the way). Tom and I went to bat for Lee.
>
> Tom once asked me to stand in for him on a panel at an APA conference that was to review the efficacy of subliminal procedures. I felt I was in a theatre of the absurd with incredibly hostile and bigoted panelists. For years after this, my greeting of Tom was ''You owe me one for that!'' He was an incredible innovator in our field and will be sorely missed. (P. Swingle, personal communication, February 20, 2011)

Tom felt that, by its nature, the right brain encourages phenomena not yet explored by science. He speculated that our ancestors were more intuitive and probably more right-brain dominant. He talked about exceptional people, people who by some tests are ''double-right brainers''; they appear to have left-dominant functions on both sides of the brain. For example, some left-handers are often ''double rights.'' Left brainers look for practical solutions.

In 1996, Tom wrote a paper on neurofeedback and brain brightening, including ways to sharpen cognitive abilities in the elderly. One of the techniques used mild photo stimulation and pulsing sounds. Tom spent many years exploring these techniques and their neuropsychophysiological effects in a controlled environment.

In 1999 he received the Distinguished Scientist Award from the Association for Applied Psychophysiology and Biofeedback. In 2002 he received a Career Achievement Award from the International Society for Neurofeedback and Research (then the International Society for Neuronal Research).

In the last few years Tom focused on biofeedback and neurotechnology research at the University of Washington in Seattle. In 1998, he designed the Stay-Awake EEG system for truck drivers and air traffic controllers. He and his wife, Helen Kogan Budzynski, were conducting studies on the effects of audio-visual stimulation on the brain, the priming effects of binaural tones on the EEG, neurofeedback for enhanced academic performance and cognitive processing in the head injured, and audiotapes and brain brightening in the elderly. He learned to administer and analyze Q-EEGs, which were used in many studies. True to his multimodality background, he additionally published on skin conductance. His relaxation tapes were used in a 2009 blood pressure study with HRV measures (Tang, Hama, & Vezeau, 2009).

Helen notes, ''Tom has always been in demand to test out new instruments because he delves into the mechanics as well as the measurement and its physiology. Already, since he has passed away, we received two new requests for the testing of new products for treatment and research.''

Tom is survived by his wife, Helen; son, Peter, and daughter-in-law, Helen; and his three grandchildren, Kayla, Sarah, and Tristan. His papers and publications will endure. The ideas behind his greatest inventions will remain. His passion for science was contagious; his work ethic extraordinary. His continuous inquiry persisted well beyond his retirement. We have all lost a remarkable thinker, a consummate tinkerer, and warm human being. His written words, born of curiosity, scribed by intellect, and nurtured by intuition, will live on.

REFERENCES

Basmajjian, J. (1962). *Muscles alive: Their functions revealed by electromyography*. Self-published.

Budzynski, T. H. (1977). Tuning in on the twilight zone. *Psychology Today*, *11*, 38–44.

Budzynski, T. H. (1996). Brain brightening: Can neurofeedback improve cognitive process? *Biofeedback*, *24*, 14–17.

Sittenfeld, P., Budzynski, T., & Stoyva, J. (1976). Differential shaping of EEG theta rhythms. *Biofeedback and Self-Regulation*, *1*, 31–45.

Sperry, R. W. (1964, January). The great cerebral commissure. *Scientific American,* pp. 42–52.

Swingle, P. G. (1992). *Subliminal treatment procedures: A clinician's guide*. Sarasota, FL: Professional Resource Press.

Tang, H., Hama, V., & Vezeau, T. (2009). An audio toll for blood pressure regulation in older adults. *Geriatric Nursing*, *29*, 6–16.