

Research on light and sound

Welcome!

I've spent the last five years reading all the available research on mind machines – and now I've pulled together the most accessible of this information as a way to encourage you to try this technology yourself.

Mind machines are referred to in these reports in a number of ways:

- BWS (Brainwave Synchronisers)
- LS (light and sound devices)
- AVS (audio visual stimulation)
- Photic stimulation

All refer to the same technology which is built into our range of mind machines.

All our mind machines can generate all the frequencies mentioned in these reports.

I've condensed some of the reports for readability – and because some of the data is repeated. For example I've taken out three paragraphs from the extract from Megabrain Power as the original full reports are included here.

I've had the very good fortune to spend time with many of the people mentioned in these pages: Robert Austin, Tom Budzynski, Michael Hutchison, Julian Isaacs, Harold Russell and David Siever – all thorough and committed researchers at the cutting edge of peak performance technology.

Have a great read. You don't need to understand it all. I just hope you read enough to see for yourself that mind machines really do work, and you're encouraged to try a unit in your own home, using our 100% money back satisfaction guarantee.

Chris Payne, Managing Director, LifeTools

Slow wave photic stimulation in the treatment of headache

A Preliminary Report by Glen D Solomon, MD (printed in Headache, the official publication of the American Association for the Study of Headache, August 16, 1985)

Acute muscle contraction headache

Fifteen patients, 10 female and five male, aged 21 to 41 years (mean 33.4 years), were treated with slow wave photic stimulation. Fourteen of 15 patients in this group noted complete relief of their headache. One patient noted a 75% reduction in headache intensity.

Chronic muscle contraction headache

Six patients, four female and two male, aged 21 to 49 years (mean age 32.3 years), were treated. The duration of headache ranged from three days to three months. Two of the six patients had prolonged muscle contraction headaches following migraine headaches.

Five of the six patients in this group noted complete relief of their headache. The one patient who noted no relief was a 22 year old male with a continuous headache for

three months, which, on follow up evaluation, was found to be induced by inhaled nasal steroids.

Placebo controlled group

Four patients, all female, with acute muscle contraction type headache were treated in a placebo-controlled trial none of the four responded to placebo, but all responded to treatment with slow wave photic stimulation.

We conclude that, in this preliminary report, slow wave photic stimulation appears to be effective in the treatment of acute and chronic muscle contraction type headache.

The clinical guide to light and sound by Thomas Budzynski, PhD (excerpt).

Tom Budzynski started out as an aerospace engineer, working on the top secret SR-71 Blackbird project. He then earned an MA and PhD in Psychology and went on to develop several of the early biofeedback devices including the Twilight Learner. With Denis Waitley he developed the top-selling tape course "The Subliminal Winner" for Nightingale Conant. Since then he's been heavily involved in research at his stress management clinic.

In 1980, at my clinic in Denver, we studied one of the early commercial LS units and, as mentioned in Michael Hutchison's book MegaBrain, we found that use of the unit appeared to enhance hypnotic induction, produced drowsy, hypnogogic-like states (at Theta frequencies) and, at times, vivid holographic images.

It also served as a facilitator of "unconscious retrieval" during re-scripting procedures. Frequencies in the low Theta range (3-7 Hz) seemed to help illicit childhood memories. These images were used in the next therapeutic session to aid in the uncovering and re-scripting of traumatic material.

Dr Gene Brockopp (1984) a Buffalo New York Medical Researcher, found that the LS device produced dramatic effects in some subjects.

He reviewed the related research at the time (the early 80s) which include photic and auditory stimulation of the brain, consciousness and hemispheric differentiation, on EEG patterns and personality variables, and on the behavioural effect of induced stimuli patterns.

One of his findings that was that coherence of the high frequency EEG pattern is apparently related to increased intellectual functioning. This leads to the conclusion that if the LS device creates or facilitates coherence it could lead to increased intellectual functioning. Dr Brockopp also found that when a brainwave state is experienced, learned, and practiced over a period of time, it is resistant to habituation at least in the short term. Hutchison (1986) notes that this may explain why the LS device seems to have an accumulative effect, so that, after a series of experiences with the LS, users seem to find it easier to self-produce the desired brain wave state at will.

The effects of photic stimulation and private self-consciousness on the complexity of visual imagination imagery

Alan Richardson and Fiona McAndrew of the Department of Psychology at the University of Western Australia. Reported in the British Journal of Psychology (1990), issue 81, pages 381-394.

Of all the many procedures that appear to bring about an equivalent of the naturally occurring hypnogogic state (Schacter, 1976) and which, in turn, facilitate the emergence into awareness of visual imagination images, the easiest, safest and potentially most precise in its effects, is photic stimulation.

Three levels of photic stimulation (6, 19 and 18 Hz) were employed to induce visual imagery in 40 female undergraduates. Results: more complex imagery is reported under the averaged 6 Hz and 10 Hz conditions than under the 18 Hz condition. More complex imagery is reported under the 6 Hz than under the 10 Hz condition, and more complex imagery is reported by members of the high than by members of the low Private Self Conscious groups [i.e. those interested in their own internal states experienced more complex imagery – Chris].

Alpha and theta response to the Mind's Eye Plus

by Bruce Harrah-Conforth PhD at Indiana University. (The Mind's Eye Plus was a forerunner to the MindLab, and was designed by the same person.)

Introduction

As early as 1943 Adrian and Matthews showed that the resting rhythms of the brain could be made to assume the frequency of a photic stimulus ("entrainment"). Kamiya (1968) discovered that the various EEG frequency states seem to correspond to psychological states. And Green et al (1977) showed that it was possible to voluntarily control both these states and frequencies. Neher (1961, 1962) demonstrated that entrainment of these states was easily accomplished using photic stimulation.

In recent years a growing number of devices have been produced which claim to use the principle of entrainment for the purposes of enhancing performance, stress reduction, creativity and a host of other by-products.

The aim of this study was to ascertain and analyse the efficacy of the Mind's Eye Plus, a state-of-the-art light and sound brain entrainment machine, in producing such states.

The Mind's Eye Plus

The Mind's Eye Plus enables the user to programme photic (LED equipped goggles) and auditory (a complete sound synthesiser) stimuli to any desired frequency within the Beta, Alpha, Theta and Delta range. This type of brain stimulation generates a "Neher (1961, 1962) demonstrated that entrainment of these states was easily accomplished using photic stimulation" high degree of arousal of the brain's limbic system. Gellhorn (1972) demonstrated that these types of repetitive stimuli drive the brain's cortical rhythms which in turn produces

a pleasurable effect. This is one effect that manufacturers of products like the Mind's Eye frequently claim to be associated with the deep relaxation their products seem to yield.

Methods and Materials

The subjects were 15 volunteers, six females and nine males, ages 25 to 38, all of whom were considered to be in good health. The test environment consisted of having the subjects lie on a bed in a dark room, with their eyes shut throughout the session. Three electrodes were placed 'left optical to left parietal'. A baseline reading was established with regard to the normal relaxed state of each subject.

The subject was then equipped with a set of stereo headphones through which a 100 cycle tone was filtered (creating a "pink" noise) and modulated at 60 Hz (cycles per second). The average time of stimulation was 20 minutes. During each session the subject's production of beta, alpha and theta waves were monitored.

EEG sensitivity settings were tested from a level of 3 uvpp through 100 uvpp. Brain wave readings were also taken at five-minute intervals following the stimulation for a total period of 20 minutes.

The same readings were then taken while subjects were using the Mind's Eye Plus (starting frequency 40 Hz, ramp time 10 minutes, target time 15 minutes). Various light patterns and sound sources (both controlled from the Mind's Eye computer) were compared for effectiveness.

Results

As expected, subjects produced a "classic" alpha driving response when they closed their eyes, even though no auditory stimulus was present. A baseline was then established for their resting brain.

• Influence of Pink Noise

There was no significant difference between resting wave production and wave stimulation (<0.05). Some increase in alpha waves was noted, but in general the effects of the pink noise alone were not significant.

• Influence of Mind's Eye Plus

Immediate visual and auditory indications showed that the Mind's Eye Plus increased beta activity, increased alpha activity, caused some alpha
"I have little doubt that brain entrainment technology is a highly effective means of inducing changes in consciousness"
attenuation, and increased theta action. During this latter process of theta stimulation alpha waves were somewhat attenuated. In order to compare each subject's susceptibility to auditory stimulation the significance of Mind's Eye Plus stimulation was only considered if it was more than >0.05 above the noise response. The findings seemed to indicate a link between an altered EEG response and the Mind's Eye Plus that could not be evidenced with the pink noise stimulus alone.

Hemispheric Synchronisation

One of the most frequently touted claims for light and sound entrainment devices is that they balance the brain's left and right hemispheres. The phenomena associated with the

Mind's Eye Plus would seem to validate this claim and be associated with intense discharges from the sympathetic and parasympathetic nervous systems. This simultaneous discharge is indicative of trophotropic (non-dominant) and ergotropic (dominant) hemispheric arousal.

Trophotropic Arousal

Trophotropic arousal can be seen through various parasympathetic changes (reduction in heart rate, blood pressure, and sweat secretion), striated muscle relaxation, and synchronised cortical rhythms. Psychologically, this state is associated with Zazen and yogic Samadhi (Lex, 1979), and the accompanying production of progressively lower brain waves. In addition, Ornstein (1972) has theorised that this hemispheric arousal provides for a shift from the linear mode of time-bound verbal thought to the timeless, "oceanic" mode of the mystic experience.

Ergotropic Arousal

Ergotropic, or dominant hemisphere arousal results in changes in the sympathetic nervous system that may manifest themselves as increased heart rates, blood pressure, sweat secretion, and increased catabolic hormone secretion, epinephrine, norepinephrine, cortisol, thyroxine, etc.

Psychologically, this state results in an excited cerebral cortex and can include creative, psychotic and ecstatic experiences.

As these two states are induced by such devices as the Mind's Eye Plus, an interesting combination of effects occurs. In animals, ergotropic arousal leads to rage while trophotropic arousal leads to sleep. In humans, these two states may be interpreted as hyper- and hypo-arousal, or ecstasy and samadhi.

It is interesting to note, although this report does not make such causal claims, that the effects, both psychological and physiological, of the Mind's Eye Plus correspond to what one would expect to find with such stimulation.

Comments

The Mind's Eye Plus appears to have produced significant change in the theta band in 81% (13 out of 16) sensitivity frequencies, alpha increase in 68% (11 out of 16), alpha attenuation in 12% (2 out of 16) of the settings, and beta enhancement in 31% (5 out of 16).

In comparison, the test tape which included only pink noise as their sound source showed no significant theta enhancement, some alpha enhancement (37%), and slight beta change (25% or 4 out of 16).

It is suggested that in this test with these subjects the Mind's Eye Plus did assist in the alteration of the subjects' brainwave bands.

Subjective Correlates

Perhaps the most difficult task to undertake is to assign psychological meaning to physiological change. Although the actual meanings of brainwaves are not understood, research has permitted a general consensus to be adopted with regard to these states. Cade (1979), building upon the work of Lesh (1970), was able to formulate a relationship

between objective and subjective states. His findings indicated, and have been verified by other
“I lost all sense of my body”, “I felt like I was flying”, “I was deeply relaxed”, I felt like I was out of my body”
researchers, that various brainwave states seem to correspond to various psychological ones.

The beta state (13-30 Hz) corresponds to our normal waking consciousness.
The alpha state (8-13 Hz) appears to be the equivalent of relaxation and concentration.
Theta waves (5-7 Hz), are such that they seem to reflect a deeply internalised state, deep relaxation, a sense of quieted emotions, and the production of hypnogogic imagery.
Delta waves (0.5-4 Hz) are those which are usually associated with sleep or other similarly unconscious states.

Discussion

Each subject was given a questionnaire at the conclusion of each test in which to report their subjective sensations. The questionnaire included multiple choice questions concerning the general feeling produced by the machine (tense, anxious, uncomfortable, heavy, relaxed, calm, alert, creative, spiritual, none of the above, no change, other), follow-up questions on those states, multiple choice questions concerning the light patterns and what each subject thought they saw, and questions about their physical sensations during the test. Subjects were given a brief personal interview to expand upon these thoughts.

The relationship of test subject's subjective reports of their experiences using the Mind's Eye Plus and the pink noise to their brain wave indications appears to verify the findings of the researchers such as those mentioned above.

While little significant relaxation occurred during the pink noise sessions, subjects reported feeling marked changes in their bodily sensations during the Mind's Eye Plus sessions. This seems to correspond to an increased production of theta and alpha waves and an occasional attenuation of alpha waves experiences by subjects while using the machine.

While one subject did respond that the Mind's Eye Plus made him feel nervous and uneasy, the remainder of the subjects' comments were such typical descriptions as “I lost all sense of my body”, “I felt like I was flying”, “I was deeply relaxed”, I felt like I was out of my body”, etc. There appeared to be no significant difference in reports by either sex or age.

If these findings are substantiated by future research, it follows that the Mind's Eye Plus will be shown to be an effective means by which a variety of psycho-physiological conditions (stress, anxiety, self-esteem, etc.) may be altered.

While no cause and effect is implied in this research, the high incidence of similar reports among subjects seems to indicate that further studies are necessary to investigate this realm.

No theories about alpha or theta activity can be inferred from this study, but the study of the Mind's Eye Plus with regard to both subjective and objective analysis should prove rewarding.

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Dr Harrah-Conforth, in a letter to *Mega Brain Report* (Volume 1, No.2) wrote: " I have little doubt that brain entrainment technology is a highly effective means of inducing changes in consciousness. Brain entrainment, at least within my own research, has shown itself to be virtually foolproof and does indeed facilitate whole brain experiences."

Concluding, Harrah-Conforth stated "...the early indications are strong that this now-developing technology will profoundly revolutionise both our concepts of, and interaction with, our consciousness... the evolution of human consciousness is a tangible manipulable process. We can control our destiny... it would appear as though brain entrainment will be among the technologies leading the way."

Enhancing creativity

From *Megabrain* by Michael Hutchison.

I spoke with Dr Roman Chrucky, Medical Director of the North Jersey Development Centre in Totowa, New Jersey, who had been using a sound and light device extensively in his practice.

His observations supported Budzynski's: he too found that the machine had a very strong relaxing and calming effect ("It acts as a tranquiliser," he said, "and the effect seems to last two or three days. Usually you see the maximum change a day or two after they use the machine"); he too noted that the device "enhances and speeds up hypnotic induction" and enhances suggestibility ("When the client is using the AVS he's very

receptive, so using it is a great way of introducing suggestions for changes the individual wants to go through, changing habits – stop overeating, quit smoking, and so on.”).

But as we talked, Chrucky kept returning to one aspect of the AVS which he felt was most intriguing: enhanced creativity. “A lot of people spontaneously told me that they’ve felt much more creative when they’re using it.” he said. “I’ve found that using the theta frequency I get that kind of response on myself as well, increased creativity.”

Trainers for your brain

From an article by John McCrone in *New Scientist*, September 3, 1994.

The phenomenon of entertainment, or frequency-following, has a long scientific history. Neurologists first stumbled upon it in the 1930s shortly after they began recording the brain’s electrical activity with scalp electrodes and the electroencephalograph (EEG).

Researchers noted that the brain’s electrical activity – its alpha and beta waves – would fall into line with the flickering of a bright strobe lamp.

Using a simple pulsing light, it was possible to lead a person from the ragged 14 to 30

“You are immediately assailed by colourful visions and soothing noises... creating a swirling, pulsating field of light”

Hertz (Hz) beta frequencies that are the hallmark of a busy and alert mental state to the calmer waters of the 8 to 12 Hz alpha waves associated with a quiet, relaxed mind.

Although interesting enough in itself, what really attracted attention were reports from researchers like the 1940s physiologist William Grey Walter, who found that, at certain entrainment frequencies, his subjects would enter trance-like states where they began to experience deep peacefulness, dream-like visions, and other unexpected sensations.

Slip on the glasses and press the start button on the MindLab, the “mental fitness system”. You are immediately assailed by colourful visions and soothing noises. The rapid flashes of the red LEDs produce a green after image and as the flashes become closer together, and brighter with intensity, they merge to create a swirling, pulsating field of light. The experience resembles the closing sequences of everyone’s favourite science fiction movie: 2001 A Space Odyssey.

After perhaps 15 minutes, staring into this vaguely patterned visual noise, many people will begin to see shapes and even flashes of dream scenes.

The shapes are the form constants first noted by Heinrich Kluver of the University of Chicago in the 1920s when he documented the effects of psychedelic drugs like mescaline.

These shapes – fleeting impressions of gratings, spirals, tunnels, foaming bubbles and dancing dots, all outlined in neon colour – are still poorly understood but are thought to be caused by the brain trying to interpret a chaotic field of light.

Much the same patterns will be seen in a sensory deprivation chamber – or even just when staring into the dark of your eyelids as you wait to fall asleep – but they are made more intense by the prompting flicker of the LED headset.

The idea of a safe, drug-free, psychedelic trip is certainly one reason that light and sound machines are selling, says Robert Austin, designer of the Mindlab, one of the most popular of the brands of machine now on the market.

Modern systems come with special “visualise” programs that make swift changes in flicker rate (for example, from 12 to 6 Hz) that produce explosions of imagery. However, Austin says that in addition to psychedelic imagery, the machines can produce the deep relaxation people often seek through meditation.

Mind expanding

Austin sees brain machines as a quick route to the benefits of meditation: “The trouble with meditation is that people are impatient. They don’t want to sit doing nothing for 30 minutes, trying to blank their minds.

“But with light and sound, they have something to look at. A friend said to me, “Hey, I know why this thing works. You can’t think while it’s on. The pretty pictures occupy your mind so you can let go and relax.”

Would the Buddha wear a Walkman?

From the book of the same name by Judith Hooper and Dick Teresi.

Judith Hooper and Dick Teresi are co-authors of *The Three Pound Universe*. Judith has been an editor for *Esquire*, *Good Housekeeping* and *OMNI*. Dick is the author of several books on science and technology, was instrumental in launching both *OMNI* and *Longevity*, and has been an editor of seven other national magazines.

Mind machines are now available for the general public. People use the machines; they ‘feel’ a difference; they’re a phenomenon that must be taken seriously.

Obviously, these machines use light and sound to create their effects. More specifically, they alter your brain by employing a time-honoured scientific principle called “entrainment.” For example, if someone flashes a strobe in your eye at a frequency of 10 cycles per second, or 10 Hertz (Hz), your brain will be retuned to this same frequency. By doing so, the devices switch the gears in your head, downshifting you from beta, our conventional, high frequency state of consciousness, to the more relaxed alpha, theta, and delta states – forms of consciousness that operate with lower-frequency brain waves. This is essentially what Ptolemy was doing with his spoked wheel set in front of the sun. The revolving spokes were changing continuous sunlight into stroboscopic frequencies, and these in turn were causing the ancient Egyptians (Ptolemy, a Greek, actually lived in Egypt) to hallucinate because their brains were being tuned to a new frequency.

There have been a number of studies of this phenomenon over the years. In the 1880s, the French physician Pierre Jenet flashed lights at his mental patients, and some of them made sudden breakthroughs. The interest in flashing lights began in this way – as a therapeutic endeavour to straighten out the brains of disturbed patients. But today entrainment is being used to enhance the brains of healthy people as well.

Since Jenet's time, entrainment via photic stimulation has been well established, but the most significant research was conducted by the neuroscientist W Gray Walter in the 1950s. Up until

“The interest in flashing lights began in this way – as a therapeutic endeavour to straighten out the brains of disturbed patients”

that time, it was thought that photic stimulation entrained only the occipital lobe, the visual cortex of the brain. But when Walter used a strobe to send rhythmic light flashes from 10 to 25 flashes per second into the eyes of his subjects, and then recorded their electroencephalograms (EEGs), he was amazed to find that the brainwave activity of the centre cortex, the “thinking part of the brain,” was affected, rather than just the visual centre. “The rhythmic series of flashes appear to be breaking down some of the physiological barriers between different regions of the brain,” wrote Walter. “This means the stimulus of flicker received by the visual projection area of the cortex was breaking bounds – its ripples were overflowing into other areas.” Walter also reported that his subjects saw “lights like comets, ultra-unearthly colours, mental colours, not

“I don't doubt that they're entraining the brain,” says Richard Restak, MD, neurologist and psychiatrist
deep visual ones.” Today this is called the “flicker effect.”

“We live in a society that has us in a beta state most of the time,” explains inventor David Siever. “Just driving to work we're in a fight-or-flight state. Beta is great for dealing with traffic. But, in the days of the caveman, beta was designed to be used twice a day. Humans were not meant to be in beta all day long. The short-term consequences are headaches. The long-term, heart attacks. For thousands of years man has been in alpha. We need to get back to this state.”

But light-and-sound devices are supposedly good for more than just alpha. The precise frequencies for each brain state vary from individual to individual, but in general they line up like this...

What do established scientists say about this entrainment-via-household-appliance-scheme? “I don't doubt that they're entraining the brain,” says Richard Restak, MD, a neurologist, psychiatrist, and author of *The Brain and The Mind*, the comparison books to the two PBS-TV series of the same names. Restak confirmed that photo stimulation in the eye

People use the machines; they 'feel' a difference; they're a phenomenon that must be taken seriously.

definitely entrains the occipital lobe (the vision centre).

Whether just tools or planet savers, it appears that brain machines are the future. Even Dr Richard Restak, critic and neurologist, agrees: “It is the way things are going to go.”

Would the Buddha Wear A Walkman? was published in the USA by Fireside (an imprint of Simon and Schuster) and is now out of print. You may be able to get hold of it through a company that specialises in locating out of print books.

From an article by Patricia Chamberlain in Unlimited Human magazine, March 1993.

Patricia is an internationally syndicated health columnist, human potential author, hypnotherapist and MindPower for Excellence trainer. She is a regular speaker at Canyon Ranch Resort, a world-leading health and fitness spa in Tucson, Arizona.

Executives and professionals noted in the Forbes article find that using these LS (light and sound) brainwave devices is enormously helpful for reducing stress and health risks, and promoting clearer, more creative thinking.

Pacific Gas and Electric in San Francisco makes mind machines available to their employees during lunch breaks. Employees say they love it because it is so enjoyable and relaxing, and acts like a brain tune-up.

Psychology Today magazine said: “the evolution of human consciousness is in for quite a jolt thanks to... brain machine technology.”

Brain machine users are also turning in outstanding physical performances as well as mental ones: like the world class surfing of Brad Griach Lucavia and the Olympic bronze medal marathon winner from New Zealand, who both use brain entrainment devices in their training programs.

Pacific Gas and Electric in San Francisco makes mind machines available to their employees during lunch breaks.

Similar exciting body/mind training is occurring in Dr Bill Harrison’s work with racing car teams, and in Dr Robert Grant’s work with golf professionals.

Personal excellence is also extending itself into the creative performing art of Patrick Swayze, Demi Moore, Burt Reynolds, Connie Sellecca, and others, who now use home brain training computers. Quincey Jones [recording artist and producer of Michael Jackson’s Thriller] likes them so much he gives them as gifts to everyone he knows.

Devotees of LS brainwave technology claim it helps everything from chronic pain and debilitating disease to phobias and emotional disorders.

Although the traditional medical community is always cautious in making grand claims, at least one case is known where a mind machine supplier was reimbursed by medical insurance by the Alabama Medical Clinic for a terminal cancer patient.

Pain reduction and relaxation with brain wave synchronisation (photo stimulation) by C Norman Shealy, MD, PhD; Roger K Cady, MD; Richard H Cox, MD, PhD; Saul Liss; William Clousson, PhD; and Diane Culver Veehoff, RN, PhD.

Synopsis

Brain wave synchronisation (BWS) with variable frequency photo-stimulation goggles, portable battery-powered stroboscopes, using simultaneous bilateral flashing lights, have been used on over 5,000 patients with chronic pain and stress illnesses without complication. Relaxation depths of 60% or greater were reported by 88 subjects after 30 minutes of BWS. Blood levels of beta endorphin increased 10% to 50% in 8 subjects. Pain reduction and relaxation were greater when individuals used BWS, and self

hypnosis tapes concomitantly. BWS and self-hypnosis tapes appear to be valuable adjuncts for management of pain and stress.

Introduction

Although it has been known since shortly after the development of the EEG that brain wave activity “follows” repetitive light and sound frequencies (1), and experiments using brain wave synchronisation (BWS) as a tool to assist in relaxation and induction of the focused state of hypnosis were done as early as 1948, the first brain wave synchroniser (BWS) was introduced commercially in 1958 by Sidney A Schneider (2). Schneider and co-workers specifically noted that over 90% of approximately 2,500 subjects treated by 1959 had had induced light to deep hypnotic trance with the use of the BWS. His instrument consisted of a photic stimulator, controlled by the therapist or client, with variable frequencies ranging from low delta (0-1 Hz) to beta frequency (above 13 Hz), Schneider noted that each individual became entrained at a specific frequency which led to “a rainbow effect, anaesthesia, or dissociation” – “the point of least resistance” for that individual to enter a trance state, assisted by audio tapes or a live hypnotic induction.

The editor of Hypnosis Quarterly reported rapid induction of a deep trance in a previously unhypnotisable subject using BWS, to the depth of cataplexy, analgesia and amnesia (3).

The Journal of the American Medical Association in March 1959, mentioned the “hypnosis machine” which could be used to speed up hypnotic induction and to “help make labour and delivery a more gratifying experience by reducing discomfort and the need for excessive analgesia and anaesthesia” (4).

In June 1966 Bernard S Margolis, DDS reported the BWS was “a valuable tool for allaying fears and apprehensions”, and noted that coupled with hypnosis:

- Patients required less anaesthesia
- Some patients could have dental procedures with external anaesthetics
- No physiologic depression occurred
- Healing was more rapid
- Gagging could be controlled
- The frequency could be controlled by the patient.

Dr Williams A Phillips reported “the reduction and control of high blood pressure of inorganic origin,” with reduction of 10 to 40mm of mercury, using only BWS without verbal hypnotic suggestion (6). And Sadove emphasised the use of BWS to assist relaxation (7).

Method

In 1975, we began working with brain synchronisation techniques to assist chronic pain patients to achieve relaxation and detachment from their preoccupation with pain. A device created by Jack Schwartz (delivering alternative light to right and left eyes at alpha or beta frequencies) and one of Schneider’s BWS’s (using a singular light two to three feet from the patient’s eyes) were our initial instruments.

Patients were asked to grade their depth of relaxation and intensity of pain before and after 30 minutes of synchronisation. Blood pressure and pulse measurements were also done before and after BWS.

More recently, we have also measured blood neurochemicals (ne, mel, be, st and che) before and after brain wave synchronisation coupled with the self-hypnosis audio tape in eight individuals.

Results

No differences were noted between levels of relaxation achieved with the Schneider, Schwartz or Shealy brain wave synchronisers which were compared in 92 subjects. All subjects reported increased relaxation after 30 minutes of BWS, with all but four subjects reporting relaxation depths of 60% or greater, most above 75%.

With Hemi-Sync tapes alone or self-hypnotic tapes alone, depths of relaxation were similar. Relaxation music and cranial electrical stimulation were slightly less effective than BWS (50% to 60% relaxation usually).

When BWS was combined with self-hypnotic tapes, consistent relaxation depths of 70% to 100% were reported.

In 72 patients in whom blood pressure, pulse and pain intensity were measured, blood pressure and pulse were reduced 4% to 10% in 58 patients, and pain was decreased 30% to 100% in 60 patients (average over 50%). Almost invariably the “All subjects reported increased relaxation after 30 minutes of Brainwave Synchronisation, with most reporting above 75%.”

combination of BWS plus self-hypnosis (BWS/SH) was more effective than either alone. The blood pressure and pulse effects are compatible with the relaxation response. The degree of pain relief, however, is greater than that reported with the relaxation response alone (9).

In eight individuals blood neurochemicals have been measured before and after 30 minutes of alpha rhythm (10 Hz) BWS. Melatonin has been reduced 5% to 20% (average 6% decrease) and beta endorphin has been increased 10% to 50% (average 14% increase). Interestingly, these same individuals have an average increase in serotonin of 23% and an increase of norepinephrine by 18%.

Discussion

In the last 15 years we have used BWS/SH on over 5,000 clients. Most patients find BWS/SH useful in increasing relaxation and in assisting them in practising the mental relaxation exercises as well as in decreasing pain. Only an occasional person prefers self-hypnosis without BWS, whereas about 10% of individuals prefer BWS without self-hypnosis. About 5% of clients do not like either.

No seizure has been seen during BWS, even in well over 50 epileptics treated with it (using alpha or theta frequencies). No complications have been noted. This is compatible with general knowledge that seizure activity is occasionally induced at 15 Hz or higher.

Our experience with BWS coupled with guided mental relaxation exercises (BWS/SH) confirm

“Brainwave Synchronisation, even without self-hypnosis, leads to enhanced sleep induction, especially at the low theta rate”

Schneider's reports that at least 90% of individuals achieve deepened levels of focused relaxation with those techniques. Our results are also compatible with those of Benson

and others who indicated that the relaxation response is a major stress reducer and assists the process of homeostasis (9).

The increase in beta endorphins after BWS/SH is associated with a sense of well-being and decreased pain. Even though blood pressure and pulse usually decrease with BWS/SH, the increases in norepinephrine and serotonin and the decrease in melatonin suggest an increased level of alertness. This may well be consistent with Schultz's description of poised alertness reported with autogenic training (10). Decreases in melatonin, as found, are to be expected with exposure to light, and suggest that BWS may be useful for seasonal affective disorders.

The BWS studies reported here were done with fixed alpha frequencies of 10 Hz. More recently, in 30 patients, we have confirmed Schneider's reports that individuals enter a deeper state of focused attention more rapidly if they fine tune their own most entraining frequency. Most choose a rather slow theta frequency, but a few agitated persons choose high alpha rhythms. Relaxation levels of 80 to 100% are achieved within five minutes, and pain reduction appears to be greater with this self-selected synchronising rate than with the fixed 10 Hz rate.

Anderson has recently reported that variable photo-stimulation with red light emitting diodes alternately to left and right eyes stopped 36 of 50 headaches and helped another 13 headaches (11). We have used BWS in acute migraine as well as a number of chronic pain problems with similarly good success. Our BWS delivers the light synchronously to both eyes.

It is interesting to speculate that various BWS rates might affect neurochemicals differently. Since most individuals choose the lowest theta rates, those rates might increase beta endorphins more without the increases in norepinephrines and/or serotonin. Further study needs to be done to elucidate potential differences: It has been noted that BWS for greater than 40 minutes often leaves individuals feeling groggy instead of alert immediately after a session. Thus we recommend 20 minute sessions most of the time. Benson reported that two daily 20 minute deep relaxation sessions led to decreased insulin requirements and catecholamine production for up to 24 hours (9).

Finally, we have noted that BWS, even without self-hypnosis, leads to enhanced sleep induction, especially at the self-selected low theta rate. And return to sleep is more rapid with BWS if one awakens during the night and uses BWS to return to sleep.

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Sound and light research

From Michael Hutchison's best-selling book Megabrain Power

It has been well established over the last 50 years of research that these LS (light and sound) devices can rapidly produce states of deep relaxation, may increase suggestibility and receptivity to new information, and may enhance access to subconscious material.

Recent evidence from around the world indicates that the machines are beneficial in the treatment of migraine headaches and learning disorders, alleviation of pain, enhancement of immune function, and much more. Here's a summary of some of the most interesting work done in the last decade.

Brain-wave entrainment

British psychologist Julian Isaacs, PhD, working in the USA with a private research group called The Other 90 Percent, studied the brainwave effects of light and sound devices using an advanced brain-mapping EEG.

They found "very clear evidence of brainwave driving" as well as a very strong correlation between the intensity of the light used (whether red light emitting diodes (LEDs) or incandescent bulbs) and the brain entrainment: the brighter the lights, the more entrainment.

Deep relaxation

Dr Norman Thomas and his associate David Siever, at the University of Alberta, gave a group of experimental subjects light and sound stimulation at an alpha frequency for 15 minutes, while they were being monitored for muscle tension, using an electromyograph (EMG), and for finger temperature. A control group, similarly monitored, was asked "The light and sound group showed dramatic increases in relaxation, reaching profound relaxation states"

simply to relax, without any light and sound devices, for the same 15 minutes.

Significantly, both the experimental group and the control group were what researchers called "resistant" or "non-hypnotisable" subjects.

While the control subjects stated that they believed they were very relaxed, the EMG and finger temperature monitors showed that they were actually experiencing increased amounts of muscle tension and decreases in finger temperature (associated with tension or stress).

On the other hand, the light and sound group showed dramatic increases in relaxation, reaching profound relaxation states that continued for long periods after the 15 minutes of light and sound. The researchers wrote: "it appears that audio-visual stimulation offers a simple hypnotic device in otherwise resistant subjects."

Relaxation for sedation

In 1988 anaesthesiologist Robert Cosgrove Jr. PhD, MD, undertook preliminary studies of light and sound. In his initial evaluations, Cosgrove, an authority in pharmaceuticals and biomedical engineering, noted that light and sound was “clearly very powerful in its ability to cause deep relaxation in most subjects.

Its effectiveness has been so great that we are very enthusiastic about the prospect of evaluating the [device] for its sedative properties in patients prior to, during, and immediately following surgery. We are also undertaking studies to prove its utility in chronic stress.”

Neuro-pathway exerciser

Cosgrove noted that LS: “with appropriately selected stimulation protocols has been observed by us to be an excellent neuropathway exerciser. As such we believe it has great potential for use in promoting optimal cerebral performance ...Furthermore, the long-term effects of regular use of the device on maintaining and improving cerebral performance throughout life and possibly delaying for decades the deterioration of the brain traditionally associated with ageing is very exciting.”

Migraine relief

Light stimulation (through red LED goggles) was used to treat seven sufferers of migraine headaches, none of whom had been able to find relief with drug treatments. Out of 50 migraines studied, 49 were rated by subjects as being “helped” and 36 were stopped by the photic stimulation. Significantly, brighter lights were found to be more effective.

Chronic pain

Frederick Boesma and Constance Gagnon of the University of Alberta’s Department of Educational Psychology studied the effects of regular light and sound on three chronic pain patients over periods of nine to 17 months.

At the outset of the study all three individuals experienced much pain and stress caused by disabling and psychological effect of their pain, to the point that two of them were seriously contemplating suicide. But over the course of the “Consistent light and sound usage seemed to be associated with lower pain levels, easier to sleep, and improved handling of stress” study each subject showed significant reductions in pain and required less medication. The effect of light and sound did not diminish with time but actually improved in effectiveness with use. Consistent light and sound usage seemed to be associated with lower pain levels, easier to sleep, and improved handling of stress.

Long-term usage seemed to reduce and then abolish the incidence of suicidal thoughts. The patients also reported that learning how to use light and sound gave them greater control over their lives.

Relief of anxiety and stress

Dr Juan Abascal and Dr Laurel Briucato have conducted several light and sound studies (including studies of officers of the Metro-Dade Police department) at Mindworks, a Miami psychotherapy and stress reduction centre. Results indicate that light and sound significantly reduced stress symptoms such as heart rate, blood pressure, muscle tension,

and both state and trait anxiety (state anxiety measures the level of anxiety experiences at the time the research is conducted, while trait anxiety measures the disposition of individuals to experience anxiety, and is generally fairly stable over time).

Enhanced immune function?

William Harris MD, director of the Penwell Foundation, an organisation for the investigation, research, and application of different modalities for the treatment of those with AIDS/HIV, has experimented with light and sound devices and found them extremely effective. He speculates that light and sound devices may boost immune function by producing states of deep relaxation, by enhancing the patients' receptivity to suggestions for healing, improving their ability to visualise and improving the clarity of their visualisations.

“At this point it's conjecture,” says Harris, “but I think that this type of machine may actually be stimulating... the body to produce its own chemical substances,” and that these natural substances may enhance immune function and healing.

Learning disorders

A variety of research and clinical work has demonstrated beyond doubt that by speeding up brainwave activity into the beta range, light and sound machines can produce dramatic increases in IQ and, in fact, affect the entire personality.

The 450-page book *Megabrain Power* is currently out of print.

For more information on light and sound, please visit the LifeTools site at <http://www.lifetools.com>