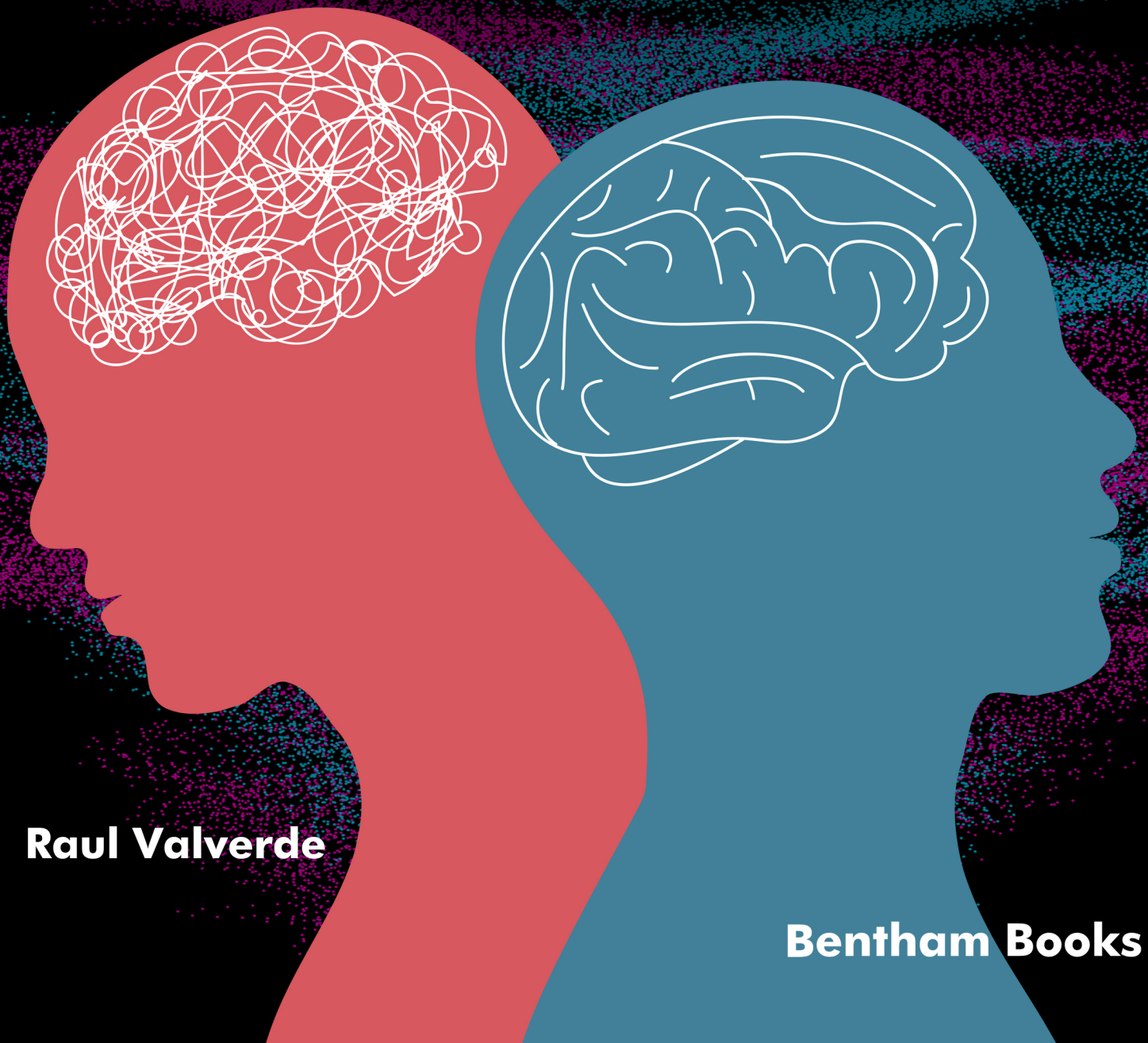


**TRANSPERSONAL PSYCHOLOGY:
ALTERED STATES OF CONSCIOUSNESS,
BIOFEEDBACK AND NEUROTECHNOLOGY**



Raul Valverde

Bentham Books

**Transpersonal Psychology:
Altered States of Consciousness,
Biofeedback, and
Neurotechnology**

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Transpersonal Psychology: Altered States of Consciousness, Biofeedback, and Neurotechnology

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FOREWORD

This book is a must-read for a transpersonal psychologist. Transpersonal psychology has proposed the use of altered states of consciousness as a tool to explore the inner self of the individual. There are many books that discuss several techniques to reach altered states and how to integrate them with transpersonal therapy. However, the main contribution of this book is the use of biofeedback and neurofeedback to measure these states and the use of neurotechnology with sound frequency to induce these states. The book integrates different tools that can work together to make transpersonal therapy a much better and richer experience. The use of sound frequencies to induce altered states has been used and researched by many authors, but this book introduces the most appropriate transpersonal therapy, in particular, for patients who are at a distant location and receiving therapy through an online medium. Reaching altered states requires practice, and the book integrates the use of biofeedback and neurofeedback to measure these states as part of the training to reach these states. The book is an eye-opener for transpersonal therapists interested in the use of technology to enhance the therapy experience. Professor Valverde has an incredible background that makes him ideal for the writing of this book; he is an electrical engineer with a transpersonal psychology background; this kind of educational background is unique and ideal for this type of book.

Distinguished University Professor Dr. I Charles Ph.D. LLD JD DPH JP FBQS FBU DICP is an international academic expert. He is the present academic chair of the Board of Quality Standards.

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PREFACE

Biofeedback is the process by which a person learns to influence involuntary body processes to receive physiological data from an electronic device that continuously monitors certain physiological parameters. It is a way of measuring the response to the physical, emotional, mental, and spiritual stresses of life. Bodies under high stress are more prone to physical discomfort and even illness. The biofeedback response occurs when the body receives new information about its status (*i.e.*, get 'feedback') and makes healthy adjustments to reduce stress and tension. The result is a reduction of nervous activity and increased vitality. Users of the feedback report a greater sense of well-being and joy.

Biofeedback instruments measure muscle activity, skin temperature, electro-dermal activity (sweat gland activity), respiration, heart rate, heart rate variability, blood pressure, brain electrical activity and blood flow. There are many types of biofeedback, such as GSR, EEG, EMG, CT, MRI, *etc.* These technologies are able to capture analog electrical signals from the body and translate those signals into meaningful information through complex algorithmic software that a technician can then decipher. Research shows that biofeedback, alone and in combination with other therapies behavior is effective for treating a variety of medical and psychological disorders. Biofeedback is currently used by doctors, nurses, psychologists, counsellors, physical therapists, occupational therapists, and other professionals.

Biofeedback is based on electrical measurements taken from the front (frontal cortex). When this information is presented to the patient, he tries to consciously change his internal reactions to modify electrical results.

Monroe, who is considered the creator of neurotechnology, proposed the method HEMI-SYNC (Synchronization of the cerebral hemispheres by means of sounds) for psychotherapy. The principle of this method states that when a pure tone is emitted, the brain resonates when it receives certain frequencies of waves and is synchronized with them; this effect is known as FFR (Frequency Following Response).

Machines created based on FFR began to be popular in the 80s; the typical machine is based on the principle of Monroe using stereo headphones that are used separately to send sound signals to each ear, for example, 2 signals of 300 and 304 Hz; in one ear only 300 Hz signal will be heard and in the other, only 304 Hz, but since the sounds are combined in the brain, the third signal of 4 Hz will be heard, which is the difference between the two sound impulses. This third signal is not an audible sound but an electrical signal that can only be created by the cerebral hemispheres acting in unison and may go unnoticed; this is because the two hemispheres are focused simultaneously on the same state of consciousness, thus increasing the brain power and inducing it to a different state of consciousness.

The Monroe Institute was created based on the principles of Monroe. The neurotechnology of the Monroe Institute is a system that mixes sequences of sound patterns designed to evoke beneficial brainwave states for different human states of consciousness. Neurotechnology is typically used to tune brainwaves into any range brainwave. With these machines, you may experience theta, alpha, delta waves or combinations of ranges using layered frequencies that mix several ranges of brainwave in a synergistic brainwave pattern. Theta brainwaves have been associated with an altered state of consciousness by many research studies.

Transpersonal psychotherapy that is based on transpersonal psychology considers that the psyche is multidimensional and there are several "levels of consciousness," and each has

different characteristics and is governed by different laws. As contrary to psychoanalysis, transpersonal psychology does not deny other schools of thinking.

Transpersonal psychology is the study of human nature and development based on the assumption that human beings possess potentials that exceed the limits of ego developed normally. The main goal of transpersonal theory is to integrate the spiritual experience within a broader understanding of the human psyche and consciousness.

A human being experiences different altered states of consciousness. Thus, we find pathological states of consciousness, such as in the case of severe depression, especially in the case of psychosis; states of consciousness, such as deep hypnosis produced by hallucinogenic drugs like LSD, and even altered states of consciousness common due to the practice of yoga, such as is the case of mystical ecstasy. Stanley Krippner defines altered states of consciousness as mental states that can be subjectively recognized by an individual or by an objective observer as being different in mental functions, the normal state of the individual, the alertness and the wakefulness. In fact, twenty states have been provisionally identified, with considerable overlap, as worthy of further study.

Altered states of consciousness have been used as psychotherapy in transpersonal psychology. One of these techniques is known as holotropic breathwork that is achieved through hyperventilation, which involves the individual breathing deeply and rapidly for several minutes. Stanislov Grof, through this technique, causes a crisis that leads to an altered state of consciousness and allows the study of the consciousness of the individual through that new state. Stanislav Grof uses the experiential healing power of this new state of consciousness to cure his patients.

Neurotechnology offers an alternative way to induce an altered state of consciousness for transpersonal therapy that can be easily implemented with the use of computer technology. With the use of biofeedback, we can measure altered states of consciousness and help train individuals to achieve these states.

Altered states of consciousness cover transpersonal experiences that involve an expansion of consciousness beyond the limits of time and space. Altered states of consciousness allow us to answer the questions of who we really are and why we are here.

This book introduces the use of biofeedback and neurotechnology for the reader (transpersonal therapist) to induce and measure altered states of consciousness to deal with mental conditions that can benefit from self-exploration and self-realization of consciousness states that could be responsible for the mental condition of the patient.

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CONSENT FOR PUBLICATION

Written informed consent was obtained from all the participants.

CONFLICT OF INTEREST

The author declares no conflict of interest, financial or otherwise.

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Declared none.

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CHAPTER 1

Brain Waves and Consciousness

Abstract: Our brain works primarily with bioelectrical energy, and it is demonstrated to be a machine of low frequencies. Our brain, in addition to processing information that is received by the senses, is capable of emitting extra-sensory information received *via* similar “electromagnetic waves.” It has been proven thanks to the EEG that the brain emits waves of varying intensity and frequency depending on the mental state of the person being observed. These mental states range from the state of stress with Gamma Wave frequencies to states of deep sleep with Delta frequencies. The chapter introduces the use of music, sound, hypnosis, and meditation to induce particular states of mind that can help people achieve desired personal goals, such as learning, creativity and relaxation as therapy anxiety and other mental illness.

Keywords: Brain Frequencies, Brain Waves, Inducing States of Consciousness, Music and Sound for States of Consciousness, Meditation and Consciousness.

INTRODUCTION

The chapter introduces the use of music, sound, hypnosis, and meditation to induce particular states of mind that can help people achieve desired personal goals, such as learning, creativity and relaxation as therapy anxiety and other mental illness. Our brain works primarily with bioelectrical energy, and it is demonstrated to be a machine of low frequencies. It has been proven thanks to the EEG that the brain emits waves of varying intensity and frequency depending on the mental state of the person being observed. These mental states range from the state of stress with Gamma Wave frequencies to states of deep sleep with Delta frequencies. The chapter introduces the use of music, sound, hypnosis and meditation to induce particular states of mind by controlling brainwaves that can help people achieve desired personal goals, such as learning, creativity, and relaxation as a therapy for anxiety and other mental illness.

BRAIN WAVES

Although the electrical power that controls our neurons is low (measured in millivolts), this power will only be required to process, manage, distribute, and use vast amounts of information and generate multiple answers (almost infinite in possibilities).

Using micro electricity, we can conclude that a brain is a low-frequency machine. In addition to processing sensory information, our brain is capable of emitting extrasensory information received *via* similar “electromagnetic waves” but at a lower intensity, similar to the frequencies of a radio transmitter-receiver. Our brain can function as a radio station, similar to how many bird species are guided at the time of migration by a genuine receiver of terrestrial magnetism located in the pituitary gland. They know where they have to fly and in which direction through this receiver. It is like having a physical compass built into your brain. The mind could be defined as the brain's “sense” (like sight is the sense of the eye).

The activity of the cerebral cortex that the EEG picks up is made up of a series of isolated waves or in groups setting a rhythm, which differ from each other in terms of their frequency, amplitude, spatial distribution, shape, duration, and reactivity (Talamillo, 2011).

Frequency represents the number of times a wave appears within a rhythm and is expressed in cycles per second or Hertz (Hz). Amplitude is the distance from the wave's baseline to its peak and is measured in microvolts (μV), and it usually fluctuates between 20 and 40 μV . The distribution indicates the cortical topographic area in which electrical activity takes place. It also refers to the physiological location of the different frequencies as a function of the corresponding brain area. The shape or morphology is expressed in biphasic, triphasic, complex, acute, regular, and irregular waveforms.

Hans Berger (1843-1941), a German psychiatrist and professor at the University of Vienna, demonstrated that an electrical potential (voltage fluctuations) existed in the human brain using an “amplifier” device called an electroencephalograph. Richard Caton (1842-1926), an English physician, demonstrated similar potential in dogs. The first types of frequencies discovered were “alpha” and “theta.” Later, they are supplemented by electroencephalograph research completed in the registration range. Each type of wave produces a distinct neuropsychological state, that is, in each of these states or frequencies, our mind, body, and physical and physiological activity are completely different. The type of neuro-chemicals and hormone substances discharged into the blood flow varies depending on frequency and quantity, as well as the presence and quantity of such substances as the mood we have, which interact to produce a physiological-mental-physical-end involving the mental state. Even when there appears to be no activity, a level of consciousness is conscious cognition that is continually thinking, and trivial ideas pass through consciousness all the time. The majority of thoughts are accompanied by behavioral reactions and small involuntary movements. When we are not actively thinking, we are most likely dreaming; according to Signer and

Streiner (1966), a person has approximately 200 daydreams throughout the day. As a result, consciousness is the sum of all perceptions. The most prevalent states of consciousness are wakefulness and sleep; however, changes in expressing both cerebral and psycho states are distinguished according to each person's conscious or subconscious feelings. These changes are directly related to brain electrical activity. The number of oscillations per second (Hz) and different states of consciousness in the brain can be used to measure this activity; our brain only perceives a limited range of frequencies that are required to operate comfortably in this three-dimensional medium. Our ears can detect 20 to 20,000 vibrations per second, while our eyes perceive colors ranging from red to violet (though extending beyond, up and down), all possible smells and tastes (which are also vibrations), and the infinite textures that we can distinguish with our skin. However, the brain not only receives but also sends vibrations. The EEG has shown that the brain emits waves of varying intensity and frequency depending on the observer's mental state. These waves are divided into the following categories (Table 1 and Fig. 1).

Table 1. Types of Brainwaves.

Types of Brain Waves	States of Consciousness
BETA WAVES: 14 Hz to 30 Hz	The frequency is between 14 and 30 Hz; Low amplitude (5-10 μ V); They occur when we are awake and in a state of focused attention and are located mainly in the anterior and central regions. We can distinguish two types of Beta waves; the lower β waves (Low Beta) and the upper β waves (High Beta). The former represents high brain activity, especially in adults, which occurs in analysis and calculation tasks. A high rate of Low Beta waves in the right hemisphere has been linked to states of anxiety and worry; however, those that originate in the left cerebral hemisphere are beneficial. The second, High Beta waves, are associated with fear, fast and compulsive thoughts, and extreme alertness. These types of waves are recorded when the person is awake in a state of normal activity, corresponding to states of conscious attention, anxiety, surprise, fear, stress.
GAMMA WAVES: 25 and 100 Hz	Frequency of 40 Hz or higher; They arise when we solve a logical or mathematical problem and contribute to information processing and learning. Their location extend throughout the entire cerebral cortex. They express pathological conditions of maximum tension, excitement and the individual enters a state of STRESS in which the coordination of ideas and normal physical activity are seriously altered.
ALPHA WAVES: 8 Hz to 13 Hz	Frequency from 8 to 13 Hz. Amplitude between 20 and 200 μ V. It is the type of wave that is recorded when we are awake, at rest, with our eyes closed, and without doing any activity. These types of waves are located mainly in the occipital lobe symmetrically in both hemispheres. Relaxation and rest, calm, reflective state; Reduction of bodily sensations; The subconscious begins to emerge: abstraction and suggestibility; Assimilation of the study; Ease of visualization of mental images.

CHAPTER 2

Schools of Consciousness

Abstract: Consciousness can be defined as the set of subjective, immediate, or remote knowledge that each being has about the world and himself and sensory perception of sights, sounds, and smells that are close to us. But our consciousness includes many more perceptions; any person, through introspection, is able to perceive through a lot of bodily sensations such as temperature, touch, different pressure points on your body, release tension, the rhythm of your breathing, or the beating of his own heart, saliva, the texture of his clothes, itching, pain, *etc.* Besides these different physical perceptions, through an even deeper concentration will become aware of your mental and emotional state, you perceive the constant variety of thoughts and different emotional states they generate from the joy caused by a memory of spontaneous happy moments childhood to sudden sadness at the thought of a tragic event. Brain waves are introduced as a way to understand states of consciousness. The person can achieve an even more abstract perception of time, mortality itself, or the continuity of its consciousness and individuality of your conscious self. This personal perception of inner experience itself is particularly evident in the moments of greatest emotional intensity however is always present to some extent in current and even bored with our lives now. Three main schools explain consciousness: Neuroscientist, Quantum, and Skeptic; this chapter will cover the main schools of consciousness, and will concentrate on the Quantum paradigm that will serve as background for the rest of this book.

Keywords: Brain Waves, Consciousness, Neuroscience, Quantum Consciousness, Scepticism.

INTRODUCTION

Being aware means being aware of everything that happens around you. It's as if, before you act, you ask yourself, "Is this what I'm doing right?" and someone who "is not you" only responds with "yes" or "no" (Hawnsner 1997). Before ordering action to the physical body, our mind studies the elements associated with the action: knowledge, physical strength, skill, and so on. Consider the risks, the consequences, the material benefits that result from the act, as well as any loss, damage, and/or suffering that the action may cause us or third parties (Hawnsner 1997).

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According to Edelman and Tononi (2000), the entire universe is one living organism with full conscious awareness of self. Our universe's consciousness is responsible for the form and purpose that all matter takes. Carl Jung (1981) discovered that all humans share a collective unconscious. This means that everyone on the planet has the same mind as everyone else. This is demonstrated in the world by accounts of shared mythology and symbols. This collectivity is a global example of the human body's unconscious mind, in which billions of cells share a similar signal. Human consciousness is an electromagnetic energy field, which could explain many paranormal phenomena like telepathy and clairvoyance.

The universe, nature and creation become conscious of itself (self-conscious) through a self-reflexive brain and generating state. The union of different brains in one system creates a supra-consciousness or superior knowledge in the network system. Individuals who are not only "individual" but also "social" consciousness would be those precursors who are called to produce real social change.

Consciousness is defined as the sensory perception of sights, sounds and smells that are close to us. But our consciousness includes many more perceptions. Any person, through introspection is able to perceive the first lot of bodily sensations such as temperature, touch, different pressure points on your body, release tension, the rhythm of your breathing or the beating of his own heart, saliva, the texture of his clothes, itching, pain, *etc.* Besides these different physical perceptions, through a mindful meditation, you can become aware of a variety of thoughts and different emotional states that generate spontaneously from past memories. It will become aware of vague emotions like irritation, excitement or boredom. The person can achieve an even more abstract perception being aware of time, mortality itself or the continuity of its consciousness and individuality of your conscious self. This personal perception of inner experience itself is particularly evident in the moments of greatest emotional intensity however is always present to some extent in current and even bored with our lives now.

Most Western scientists believe that the brain produces consciousness in some form. Of course, there is some evidence to support that claim. In our daily lives, we see evidence of common sense. We don't think clearly when we drink too much alcohol or take a hard hit to the head. We also have more sophisticated tests of the brain-consciousness relationship. All of the theories of consciousness that have been proposed over the last century have been supported by psychologists who have moved away from the materialism that characterized nineteenth-century physics based on Newton's classical mechanics. These have attempted to demonstrate that consciousness is nothing more than the physical brain's functioning. This materialistic psychology was supported by John Watson (1916),

who wrote that psychology is a purely objective experimental branch of science that does not require consciousness in the same way that chemistry and physics do not require consciousness. It is ironic that, while Watson connects psychology to Newtonian physics' classical physical knowledge, there is overwhelming experimental evidence that the universe is related to quantum physics, which cannot be made without reference to consciousness.

A British neurologist named John Lorber (1978) specializes in children with hydrocephalus, also known as water on the brain. Children with this condition have an abnormal amount of cerebral spinal fluid accumulation in the cavities inside their brain, compressing brain tissue and causing mental retardation, seizures, paralysis, and blindness, as well as death if not treated. Lorber, on the other hand, describes dozens of children and adults who have severe hydrocephalus but live normal lives. Indeed, half of the children in a sample with their cerebral space filled with 95% spinal fluid in their skull, leaving virtually no room for any brain tissue, had an IQ higher than 130. The brain scan on the left side of this slide is a normal brain. The gray area is the cerebral cortex of the brain that thinks and the black area in the center is the cerebral spinal fluid in the central cavity to the right is the brain of an adult with severe hydrocephalus. The vast majority of the head is filled with cerebral spinal fluid with only a thin crest pressed against brain tissue. As the skull barely has enough to let this person come to live, let alone function normally in accordance with modern medical neuroscience. However, this particular analysis of the brain of the person with hydrocephalus was actually a graduate student in mathematics at the University of Cambridge with an IQ of one hundred twenty six.

Near-death experiences, profound experiences that some people report when they are on the verge of death, provide some of the best evidence that consciousness can function independently of the brain. Near-death experiences are very brief stories of people who have been clinically dead and then spontaneously resurrected or revived with the memory of what they experienced during that period. According to Greyson (2010), many people who have had near-death experiences have reported vivid mental clarity, exceptional sensory imagery, and a clear memory of the experience, as well as an experience that is more real than they have in their daily lives. There are numerous ways to describe consciousness, all of which are based on the interests of various research groups, including psychologists, neurophysiologists, computer scientists, philosophers, and physicists.

Consciousness is defined as the set of subjective, immediate or distant knowledge that each being has about the world and himself. There are three major schools of thought on consciousness:

Introduction to Transpersonal Psychology and Psychotherapy

Abstract: According to transpersonal psychology, the psyche is multidimensional, and there are several levels of consciousness, each with distinct characteristics and governed by distinct laws. Transpersonal psychology does not exclude other schools of thought, just as psychoanalysis does not arise as opposed. Transpersonal psychology is the study of human nature and development based on the assumption that humans have the potential to move beyond the ego's limitations. Transpersonal theory's main goal is to integrate the spiritual experience into a broader understanding of the human psyche and consciousness. The goal of this chapter is to introduce transpersonal psychology, its history, the major contributors to the theoretical aspects of this modern psychology viewpoint that combines spiritual and neurological aspects of the psyche and principles of transpersonal psychotherapy.

Keywords: Consciousness, Origins of Transpersonal Psychology, Transpersonal Psychology, Transpersonal Psychotherapy.

INTRODUCTION

According to Transpersonal Psychology, the psyche is multidimensional. There are several “levels of consciousness,” each with its own set of characteristics and laws. Transpersonal psychology does not deny other schools of thought in the same way that psychoanalysis does not; the correct statement would be that it attempts to go further. Freud's contributions to the development of psychological science to include the concept of the unconscious in a discipline tied to positivist rationalism were crucial for a transpersonal vision. Certainly, psychoanalysis expanded our understanding of the human psyche. Transpersonal psychology encourages another avenue of exploration, one that includes the spiritual dimension of the human being. Transpersonal psychology is the study of human nature and development based on the assumption that humans have the potential to move beyond the ego's limitations. Transpersonal theory's main goal is to integrate the spiritual experience into a broader understanding of the human psyche.

Transpersonal psychology is most commonly associated with New Age crystal gazers, astrologers, witchcraft believers, drug users, meditators, occultists, spiritual healers, martial artists, and other practitioners of pop psychology.

Raul Valverde

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Of course, the stereotype is incorrect. For, like the fabled philosopher's stone, its seemingly strange exterior conceals a more important philosophical challenge, the full articulation and subsequent flowering of which may yet prove to be the reductionist mainstream's undoing (Taylor, 1992).

An exquisite order can only be appreciated in the light of certain esoteric and religious knowledge. And this is what transpersonal psychology brings to the table: order and meaning, where there appeared to be nothing but chance and chaos. The psychotherapist, for example, is usually short of arguments before the way of thinking of those who are tempted to commit suicide; only if you have a clear idea about perennial values will you be able to argue decisively, effectively, and persuasively? The essence of transpersonal psychology is to integrate what is spiritual in the human being into psychological concepts. It is the esoteric and religious knowledge and especially the inherent values of man that make up the transpersonal study (Grof 1994).

Transpersonal psychology deals with these insights but mainly with enlightenment and essential values. However, it is still possible to reduce this content further by considering transpersonal psychology as the psychology of essential values (Grof 1994). In Transpersonal psychology, enlightenment is the realisation of one's spiritual values.

Philosophy deals especially with the knowledge of God and what is divine in us, the same God that the mystics describe as consciousness and love, and what is divine in us, the self or I, which connects with this divine consciousness and spiritual values that are essential to it. Transpersonal psychology integrates this knowledge and this way of being in the psychological context; it brings these authentically divine spiritual essences and values into the context of psychological and psychopathological concepts (Grof 2010).

Transpersonal psychology deals with the spiritual in the human being, with what is beyond the three-dimensional, with what goes beyond our capacity to understand, with what cannot be defined. The word transpersonal has a connotation of eternal, which in this case is adequate because spiritual values are in a concept that goes beyond the person, which we observe as inherent to the person, but we assume a before and after, we consider them in a context beyond the person and even beyond space and time, and we see that the great puzzle of the meaning of life is only solved if we have this eternal context; If we do not have the spiritual dimension, nothing makes sense and, of course, psychology does not make sense either (Grof 2010).

Kent Wilber (1996), one of the theorists of transpersonal psychology, and to whom I think that we could also frame more specifically in the transpersonal one. The elements most used by Transpersonal Psychology Professionals are:

Intuition and its Primordial (I) - Creativity - Peak Experiences - Archetypes - Transpersonal Experiences through altered states of consciousness - Active Imagination - Imaginary World - Personal Mythology - Guided Fantasy.

HISTORY OF TRANSPERSONAL PSYCHOLOGY

In 2002, co-editors of *The International Journal of Transpersonal Studies* S.I. Shapiro and Phillippe L. Gross, along with transpersonal psychologist Grace W. Lee, conducted a thematic analysis of 80 English-language passages in the transpersonal literature published in a variety of sources including books, journal articles, websites, brochures, newsletters, dictionaries, encyclopaedias, school catalogues, and a book. A thematic analysis of these passages revealed that the two most common categories, occurring 53 (66.2 percent) and 49 (61.2 percent), respectively, were: (a) Going beyond or transcending the individual, ego, self, the personal, personality, or personal identity; the existence of a deeper, true, or authentic Self; and (b) Spirituality, psychospiritual, psychospiritual development, the spirituoso Other, less common, themes included: special states of consciousness; interconnectivity/unity; going beyond other schools of psychology; emphasis on a scientific approach; mysticism; full range of consciousness; greater potential; inclusion of non-Western psychologies; meditation; and the existence of a larger reality. (Shapiro *et al.*, 2002; Lee *et al.*, 2002; Gross *et al.*, 2002).

Abraham H. Maslow provides a preliminary and informal description of “transhumanistic” psychology in his first public announcement of transpersonal psychology in a lecture at the First Unitarian Church in San Francisco in 1967. (later called transpersonal psychology). The field of ‘transhumanistic psychology’ is concerned with transcendent experiences and transcendent values. The fully developed (and very fortunate) human being working under the best conditions is motivated by values that transcend the self’s geographical limitations. As a result, one can begin to discuss transhumanistic psychology (Maslow, 1969).

In the inaugural issue of *The Journal of Transpersonal Psychology*, transpersonal psychotherapist Anthony Sutich (founder and first editor of the *Journal of Transpersonal Psychology*) provides one of the first formal definitions of transpersonal psychology in 1969. (Vol. 1, No. 1, Spring 1969). The emerging Transpersonal Psychology (‘fourth force’) is specifically concerned with the empirical, scientific study of, and responsible implementation of, findings relevant to becoming, individual and species-wide meta-needs, ultimate values,

Quantum Consciousness Model

Abstract: The quantum consciousness model explains that our consciousness is non-local and that our consciousness creates our perceived reality by interpreting vibrating energy. The quantum consciousness paradigm explains that there is no present, future, and past but only a constant present. The quantum mind is responsible for the paradigms being constantly renewed because the level of consciousness in the human is growing, awakening, and evolving. The mind is a product of the manifestation of who we are, uses the analog of computer hardware called the brain (three-dimensional manifestation) to be able to interact in the third dimension.

Keywords: Consciousness, Quantum consciousness, Quantum physics.

INTRODUCTION

The use of quantum theories to explain consciousness has grown in popularity in recent years, and while neuroscientists are clearly opposed, more and more researchers are following suit. Brian D. Josephson (1962), of the University of Cambridge, winner of the Nobel Prize in Physics in 1973 for his studies on quantum effects in superconductors (Josephson effect), proposed a unified field theory of quantum nature that would explain not only consciousness and its attributes, but also all phenomenology observed to date in terms of parapsychological, metaphysical, and mystical experiences (Valverde 2015).

QUANTUM PHYSICS AND CONSCIOUSNESS

Hu and Wu (2010) conclude that materialistic theories for explaining consciousness are likely invalid and that quantum effects play important roles in consciousness as part of their explanation of the quantum consciousness model. Roger Penrose, a physicist, was another figure who advocated for a quantum theory of consciousness (Fig. 4). Penrose (1994) criticizes and almost mocks those who claim that artificial intelligence in computers can replicate human attributes such as consciousness. Based on Gödel's mathematical theorem and subsequent elaborations, Penrose concludes that no deterministic system, one based on rules and deductions, can explain the creative powers of the mind and its judgment.

This refutes the claim of classical physics, computer science, neurobiology, and other disciplines that consciousness is a complex phenomenon. According to Penrose, only the peculiarities of non-deterministic quantum physics could render an approximate judgment on consciousness within a theory involving quantum phenomena, microphysical conditions, and non-locality. At this point, it may be useful to clarify that in quantum physics, local conditions are not known; those capabilities that either have a quantum system or experience instant communication between two parts without a time lag between the communication of an event from one point to another system.

Another proponent of this explanatory theory of consciousness is Dr. Ian N. Marshall (Marshall & Zohar 1997), who claims to have the solution through an empirical testing system. Marshall and Zohar (1997) demonstrated that conscious thought is generated by quantum effects. Quantum physics aided in developing a quantum understanding of consciousness, as what we can perceive with our five senses is not reality. Quantum physics has demonstrated that space and time are perceptions. Our body cannot be a reality if it does not occupy the majority of the space it appears to occupy; an experiment conducted at the University of Manchester revealed that the shape of an atom's interior is almost entirely empty space. The question then became how we could possibly make the rest of the world see us if this is the case (Russell 1993).

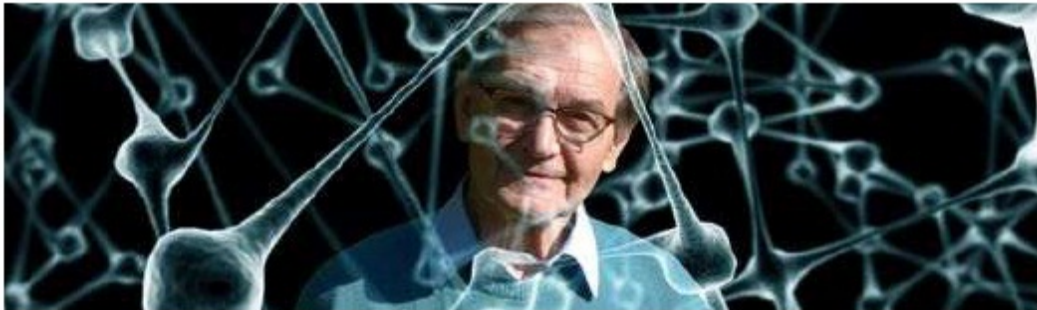


Fig. (4). Sir Roger Penrose, a main proponent of the quantum consciousness paradigm.

QUANTUM CONSCIOUSNESS MODEL

According to the quantum consciousness model, consciousness exists outside of time and space. According to Fred Wolf (1984), there has never been an adequate definition, a clear metaphor, or even a good physical picture of what time is. Time is not an observable phenomenon in quantum mechanics; it is only an extraneous ordering parameter. According to Davies (1988), time exists only as a parameter for determining the interval between events. According to Griffin (1986), the notion that physics is, in some fundamental sense, “timeless” is widely accepted.

According to Wolf (1984), space is observable in quantum mechanics. We need both the observer and the observed to observe space. Their separation is defined as 'space.'

Hu and Wu (2013) demonstrated, through theoretical and experimental studies, that: (1) human consciousness is non-spatial and non-temporal, existing outside of the brain in pre-space time; and (2) the brain serves as an interface between human consciousness and the external world. According to Hu and Wu (2010), the quantum consciousness model includes the fact that quantum effects, such as wave function collapse, play important roles in the brain and consciousness. They also explain that consciousness is most likely located outside of spacetime and serves as the foundation of reality and that conscious intentions have physical effects on matter.

The quantum consciousness model proposes that our true consciousness does not exist in our brains or bodies, but this illusion of our individual bodies combined with misinformation about our true origins has manifested the idea that we all think independently of one another. With this understanding, it appears possible to scientifically explain phenomena such as telepathy, clairvoyance, and spiritual mediums that involve the transfer of information between sources without the use of physical means of communication. When we understand that all things in the universe share a spiritual bond and that we are all part of divine intelligence, this simple understanding will fill all the gaps in modern religions and predictions about the future, as well as literally, every occurrence of events (Russell 1993). Beyond the current forms of quantum mechanics, unity of mind is most likely achieved through quantum entanglement (Hu & Wu 2010). Through the principle of entanglement, the quantum consciousness paradigm also proposes that, while each person appears to be separate and independent, we are all connected to the patterns of universal intelligence, also known as the absolute. Our bodies are components of a universal body, our minds are components of a universal mind, and all of these components are components of the universe (Valverde 2016).

According to quantum physics, the physical world and its reality are nothing more than a recreation of what has been observed. Consciousness is most likely involved in quantum effects such as wave function collapse, which is responsible for the creation of our reality (Hu & Wu 2010). We created the body and reality, just as we created the experience of our world in its various dimensional manifestations. The body is made of energy and information in its essential state (atomic or cosmic subquantum micro), not solid matter; this is only a meagre level of perception; this is energy and information arising from the endless fields of energy and information spanning the entire universal creation (Valverde 2015).

CHAPTER 5

Role of Quantum Physics in Transpersonal Psychology

Abstract: The three major schools of thought on the origin of consciousness are neuroscientists, sceptics, and quantum physicists. The quantum school explains consciousness using quantum theories, claiming that consciousness has a quantum origin, is non-local, and is created from vibrating entities that can have multiple versions depending on the observer's perception. Although most traditional psychology schools use the neuroscientist model, the quantum consciousness model has recently received a lot of attention because it can be used to support more metaphysical paradigms of psychology, such as metapsychology and transpersonal psychology which recognize the dualistic nature of the human (spiritual and physical). Although the quantum consciousness model is not well understood or accepted by traditional psychologists, it does provide a multidimensional view of the human being that may explain the complex human consciousness that is still a mystery to most of us who are fascinated by the creativity and wonderful power of the human mind.

Keywords: Consciousness, Metaphysics, Metapsychology, Quantum physics, Transpersonal psychology.

INTRODUCTION

Most Western scientists believe that the brain produces consciousness in some form. Of course, there is evidence to support that claim. There is evidence of common sense in our daily lives; for example, when a person consumes excessive amounts of alcohol or receives a hard blow to the head, we do not think clearly. We also have more sophisticated tests of the relationship between the brain and consciousness; in fact, all of the theories of consciousness that have been proposed over the last century have been supported by psychologists who have been moving away from the materialism that characterised nineteenth-century physics based on Newton's classical mechanics. These have attempted to demonstrate that consciousness is nothing more than the physical brain's functioning. This materialistic psychology was supported by John Watson (1916), who wrote that psychology is a purely objective experimental branch of science that does not require consciousness in the same way that chemistry and physics do not require consciousness.

There are numerous ways to describe consciousness, all of which are based on the interests of various research groups, including psychologists, neurophysiologists, computer scientists, metaphysicians, philosophers, and physicists. Consciousness can be defined as the set of subjective, immediate or remote knowledge that each being has about the world and himself, but the question is, where does consciousness come from? The origin of consciousness is explained by three schools of thought: neuroscientists, sceptics, and quantum physicists.

The neuroscientist school of thought holds that consciousness arises from neuronal activity that is simply more or less complex, and thus resides in the brain. The neuroscientist school of thought underpins the majority of traditional psychology theories, and it is the dominant school of thought in modern psychology. The skeptical school is defined as those who believe that science will never be able to interpret and understand consciousness. In general, this is because the secret of “being aware” is not based on a simple phenomenological problem; rather, the great challenge is to explain that part of “the consciousness that is aware of its own consciousness.” In other words, the great mystery is that we are aware that we have consciousness, which science cannot explain.

The quantum school uses quantum theories to explain consciousness. According to the quantum consciousness model, the universe is a collection of vibrating beings, and consciousness has a quantum origin. According to the model, consciousness is non-local and can function independently of the physical brain, as well as being infinite and immortal. The model also proposes that our consciousness creates our perceived reality by interpreting vibrating energy and that reality can have multiple versions depending on the observer. The quantum school also explains that we live in a collective consciousness that connects all of the consciousnesses of the universe to the supreme consciousness by employing the quantum entanglement concept, which states that the quantum states of two or more objects must be described with reference to each other, even if the individual objects are spatially separated.

This last school of thought backs up some previously unexplained psychological paradigms. Freud is a proponent of metaphysical psychology, which is a paradigm that proposes that an individual's inner information cannot be known by looking at the outside of a person (Reitinger 2013). Freud could not find the biological connection during his time of work, which caused him to focus on other topics and almost abandon his metaphysical psychology research (Tresan 1996). The metaphysical psychology paradigm recognizes the inner side of the individual but cannot connect it to the biology of the physical brain; however, because the quantum consciousness model recognizes that consciousness is independent of the brain, psychologists can use this model to analyze a psychological problem from a

dualistic perspective (spiritual and physical). The model also supports the transpersonal psychology paradigm, which acknowledges consciousness' spiritual and immortal nature (Grof 1994). These paradigms could not be explained without the quantum consciousness model because the neurological model does not recognize the dualistic nature of the human being.

TRANSPERSONAL PSYCHOLOGY AND METAPHYSICS

According to Transpersonal Psychology, the psyche is multidimensional. There are several “levels of consciousness,” each with its own set of characteristics and laws. Transpersonal psychology does not deny other schools of thought in the same way that psychoanalysis does not; the correct thing to say is that it attempts to go further. For transpersonal vision, Freud's developments were crucial in the development of psychological science, allowing the concept of the unconscious to be included in a discipline that was tied to positivist rationalism. Certainly, psychoanalysis expanded our understanding of the human psyche. Transpersonal psychology encourages another avenue of exploration, one that includes the spiritual dimension of the human being. Transpersonal psychology is the study of human nature, and development is based on the assumption that humans have potentials that exceed the limits of the ego as it develops normally. Transpersonal theory's main goal is to integrate the spiritual experience into a broader understanding of the human psyche (Valverde 2015).

Transpersonal psychology assumes that humans can achieve harmony and transcend through spiritual development by studying states of consciousness and man's full potential. Transpersonal refers to something that extends beyond the scope of a person's own experience or personal history. The term transpersonal refers to what exists outside of the person who is the essential being. The study of Eastern religions, Metaphysics, and Christian mysticism has resulted in many of its discoveries and contributions. Transpersonal psychology is fascinated by various forms of Buddhism, meditation, yoga, mystical experiences, psychophysiological effects, and the limits of consciousness. The ultimate goal of all of this is to try to achieve an awakening, which is a higher level of awareness that integrates psychology and spirituality.

GROF AND TRANSPERSONAL PSYCHOLOGY

“Transpersonal Psychology” is defined in Stanislav Grof's book (Fig. 9) as the perception of the spiritual dimension in a psychological language. Many events in this world appear to make no sense, and they truly do not make sense when we consider only the material dimension. Suffering and death appear meaningless, and even life seems meaningless at times. But if we include the spiritual dimension in our perspective, everything changes, and what was previously

CHAPTER 6

Altered States of Consciousness and Transpersonal Psychology

Abstract: Transpersonal psychology is the study of human nature that begins with the assumption that humans have potentials that go beyond the limits of their ego and integrate spiritual experience into a broader understanding of the human psyche and consciousness. Altered states of consciousness have been used as psychotherapy in transpersonal to help individuals for self-exploration and self-analysis and proposed by many psychologists during the last decades as a way to explore the human psyche and provide a better understanding of the human mind.

Keywords: Altered States of Consciousness, Consciousness, Quantum consciousness, Quantum physics.

INTRODUCTION

The human being goes through various altered states of consciousness. Pathological states of consciousness, such as in the case of severe depression, especially psychosis, states of consciousness such as deep hypnosis produced by hallucinogenic drugs such as mescaline and LSD, and even altered states of consciousness that are common in the practice of yoga and in the case of mystical ecstasy, can all be altered. A concrete and precise definition of so-called altered states of consciousness would be impossible to provide (ASC).

Many people find it to be an ambiguous term. The scientific community is divided on how to define their functions, location, objectivity, and so on. Even with the added constraints of language, we try to be as objective as possible; however, as the general principles of quantum theory state, we must be aware that we can only know a part of the reality, which will always be “the reality” of the observer.

THE ALTERED STATES OF CONSCIOUSNESS

Historically, psychology distinguished two states of consciousness: waking and sleeping. However, in his time, the great psychologist William James (1985) stated, “I am sure that, between the two extreme states of consciousness that we

know, there are many other states that do not have to be pathological.” These were indeed prophetic words because we have now identified many of these states, many of which are beneficial to humans.

According to Stanley Kripner (2000), ASC are mental states that can be recognized by an objective observer other than the individual who experiences them as differences in mental functions; the individual's normal state, alertness, and waking. In fact, twenty states have been tentatively identified as deserving of further investigation, with significant overlap.

The ASC can occur spontaneously or as a result of a variety of factors. Among these are hypnosis, meditation, psychedelic drug use, hearing music, colors, or perfumes, sensory isolation, electronic brain stimulation with a brain synchro energizer (Ossebaard, 2000), and so on.

In general, they are mental states that are likely to be recognized by an individual (or an objective observer of the individual) as distinct from normal psychological functions of the individual alert. The most well-known and widely practiced ASC is meditation, which is now practiced in universities, colleges, and schools. Individuals realized as early as the cavern era that focusing on a single stimulus, such as sounds or breathing, produces a unique type of consciousness. Hardt and Kamiya (1978) discovered that in subjects who practiced meditation, alpha activity was more pronounced in the frontal and top of the head, despite the fact that these wave trains are more common in the occipital region.

Another known method of inducing ASC is through neurological rhythmical stimulation of the brain, which is accomplished through a repetitive quality of sensory stimuli that begins to generate a synchronous pattern of brain waves known as the Monroe effect (Monroe 1982). Ornstein (1973) describes a similar phenomenon known as the Ganzfeld effect, which is caused by looking at a white screen or by placing on the eyes two devices resembling half balls used in ping-pong games, after which the subject blocks his or her sense of sight while an electroencephalogram (EEG) detects an increase in frontal alpha waves.

These and other studies have shown that meditation increases blood flow and decreases oxygen consumption, both of which are caused by a profound change in metabolism. It also increases the electrical resistance of the skin, providing an index of the subject's state of relaxation. We can only mention that after several hours of sleep, the electrical resistance of the skin is doubled, whereas after a few minutes of meditation, it quadruples (Hafner 1982).

Meditation also causes a rapid decrease in blood lactate levels—a byproduct of cell metabolism—possibly because it is combined with calcium, which is required

for nervous system transmission. In fact, a high blood lactate level has been linked to panic disorder (Hafner 1982).

Our brains build concrete images mathematically by interpreting frequencies from another dimension, a realm of primary reality that is significant, scheduled, and transcends time and space reality. In this sense, the brain can be described as a hologram interpreting a holographic universe, and the ASC may be due to a literal harmony with the invisible matrix that generates concrete reality (King 2012).

According to this scheme, if events arrive in the form of a holographic representation of frequencies that transcend space and time, they do not have to be communicable because they are potentially simultaneous and available everywhere. According to David Bohm (1980), the universe is a hologram that appears to be a range of frequencies that give the illusion of immediate and tangible apparently creation. The most harmonious and coherent states of consciousness are in tune with this fundamental reality. According to David Bohm (1980), whatever is manifested by nature has “n” dimensions, is timeless, and cannot be handled in any way.

What exactly happens neurologically when we enter alternate states of consciousness is still unknown. This gap in our understanding of these kingdoms is largely due to deficiencies in both research tools and philosophies used by scientific research, as well as society's general reluctance to accept such states as real. Understanding how our brains create the bridge to stimulate altered states of consciousness is important within the traditional scientific practice, but understanding it tells us little or nothing about the correlation with psychological phenomena with which we are able to interpret altered states of consciousness. This inner cosmological view, or its representation of our quantum reality, is what we are dealing with.

Once we accept this premise as our primary metaphor for altered states of consciousness, we can hypothesize that our brainwave frequencies are measurement indicators of our psychological states and correspond to the various ways in which we produce. In other words, these frequencies are the building blocks of our quantum reality. This is how we create, outside of the Heisenberg Principle, which states that our fields are a unified experience. Cade *et al.* (1979) performed EEG tests on 70 subjects and measured the ESR (electrical resistance of the skin), and using the results, and they were able to construct the table below, which represents the objective and subjective correlates of these states.

Biofeedback

Abstract: Biofeedback is the process of learning to influence involuntary body processes in order to receive physiological data from an electronic device that continuously monitors specific physiological parameters. It is a method of assessing how people react to physical, emotional, mental, and spiritual stresses in their lives. Stressed-out bodies are more prone to physical discomfort and even illness. When the body receives new information about its status, it responds by making healthy adjustments to reduce stress and tension. Biofeedback relies on electrical measurements taken from the front of the body (frontal cortex). When this information is presented to the patient, he attempts to consciously change their internal reactions in order to change the electrical results. The chapter discusses biofeedback technology and its applications in psychology and other treatments.

Keywords: Altered states of consciousness, Biofeedback, Neurotechnology, Transpersonal therapy.

INTRODUCTION

The term “biofeedback” literally means “responding to life.” Miller's work paved the way for researchers to investigate biofeedback processes. Miller (1978) built an apparatus with sensitive electrodes linked to a monitor so the patient could see how the skin temperature behaved, teaching patients to relax and concentrate in order to relax the smooth vasculature of vessels' peripheral blood to lower skin temperature.

Biofeedback is the process of learning to influence involuntary body processes in order to receive physiological data from an electronic device that continuously monitors specific physiological parameters. It is a method of assessing how people react to physical, emotional, mental, and spiritual stresses in their lives. Stressed-out bodies are more prone to physical discomfort and even illness. The biofeedback response occurs when the body receives new information about its current state (*e.g.*, receive 'feedback') and makes healthy adjustments to reduce stress and tension. As a result, nervous activity is reduced while vitality is increased. Users report a greater sense of well-being and joy as a result of the feedback.

Muscle activity, skin temperature, electro-dermal activity (sweat gland activity), respiration, heart rate, heart rate variability, blood pressure, brain electrical activity, and blood flow are all measured using biofeedback neurotechnology instruments. These technologies are capable of capturing analogue electrical signals from the body and converting them into meaningful information *via* complex algorithmic software that a technician can then decipher. Biofeedback, both alone and in combination with other therapies, has been shown in studies to be effective in treating a wide range of medical and psychological disorders. Doctors, nurses, psychologists, counsellors, physical therapists, occupational therapists, and other professionals currently use biofeedback. Computer scientists also use biofeedback to create human-computer interactions (Valverde, 2011).

According to Jonas and Levin (1999), biofeedback is ideal for patients seeking softer, less toxic, and less invasive therapies. In the field of psychology, the biofeedback technique is used to treat phobias, neurosis, anxiety, depression, and insomnia.

BIOFEEDBACK

Biofeedback is the art of listening to the inner tracks given to us from our own body; by being aware of ourselves, we can get to the real possibility of self-control. The changes that occur in our mind-body can be measured. The scientific basis of biofeedback is that humans are capable of observing their body facts that they are normally not aware of, such as the presence of alpha waves in a graph or screen.

Biofeedback is a particular kind of feedback, feedback from different parts of our body, the brain, the heart, the circulatory system, the different muscle groups, and so on.

The feedback is obtained by hooking the patient up with equipment that can amplify one or a number of his body signals and translate them into readily observable signals. These signals may be metric, light displays, and/or audio tones.

Once a patient can “see” these signals, he has the information he needs to begin controlling them. Seeing the signals provides a positive reinforcement so he feels he can change the signals.

Biofeedback is a preferred mode of treatment because it is easier to use than other modalities. You just need the instrument and a patient, no bulky equipment. Safer than chemotherapy (with no side effects), it has been the case when medication is used in conjunction with biofeedback as in migraine headaches or epilepsy;

however, oftentimes, due to the physiological change from biofeedback, medication has often been lowered or eliminated. It is more efficient because it is a self-control model and the responsibility for one's health goes to the patient. It is assumed that the patient does want to get rid of his condition unless, of course, there is a secondary gain (explain), then psychotherapy may be used. The primary goal of biofeedback is to promote self-control of physiological processes.

There are three requirements for successful biofeedback training:

- The symptom to be controlled must be constantly monitored with sufficient sensitivity to detect moment by moment changes. *e.g.*, especially important in muscular re-education and thermal training to enhance reinforcement.
- Changes in the physiological measure must be fed back immediately to the patient attempting to control the symptom, again positive reinforcement.
- The patient must be motivated to learn the process.

It sometimes is wise to try another mode if a patient becomes stuck at a certain point and is unable to progress. For example, if a patient is working on thermal training and becomes stuck, try using EMG to allow the patient to feel the progress from muscular tension, then go back to thermal. This procedure sometimes “unsticks” a sticky situation. This situation is different from the patient who does not care about treatment and does not try during the sessions and does no “homework”. Oftentimes a patient will not be appropriate for biofeedback training and will have to be terminated from treatment.

By biofeedback, humans can control their states of consciousness, like the mystic who follows the methodology or the yogi zen, only in the human case it would be a mystic manipulated control. On another level, and in their definition, this is a cognitive learning process that is directed inwardly.

BIOFEEDBACK INSTRUMENTS

The instruments most commonly used in the practice of biofeedback are (Sonty 2003):

- EEG (Fig. 11), which measures the brain's electrical activity.
- ESR (Fig. 12), which is able to measure the electrical resistance of the skin.
- EMG (Fig. 10), which detects the electrical impulses in muscle tension.
- GSR (Fig. 13), the galvanic skin response
- Polygraph technology (Fig. 14), which allows determining the emotion experienced.
- Heart rate variability (HRV), which detects the physiology of emotions.

Holotropic Therapy

Abstract: Throughout this chapter, we will study Holotropic therapy that is a way to produce an altered state of consciousness without drugs. This is done with hyperventilation by making an individual deeply and rapidly breathe for several minutes, and it is also accompanied by music and some verbal guidance from the person who leads the session. This technique allows the individual to explore his or her inner world and perform an auto exploration that serves as psychotherapy helpful for several mental conditions.

Keywords: Altered states of consciousness, Holotropic therapy, Transpersonal psychology.

INTRODUCTION

Throughout this chapter,, we will concentrate on Stanislav Grof (1994) and Holotropic therapy. We'll also go over the above-mentioned states of meditation: yogic ecstasy and mystical ecstasy. Stanislav Grof, as previously stated, is one of the founders of transpersonal psychology. He is a Czech-born psychiatrist who spent the majority of his career in the United States. He was a psychiatry professor at Johns Hopkins, and his most recent work was at the Esalen Institute, a long-time centre of transpersonal psychology. Grof has conducted extensive and in-depth research on the effects of LSD. In the 1960s, he directed approximately three thousand sessions with the drug and had access to approximately two thousand case histories of other cases about which he had not personally spoken before LSD was banned in the United States.

What exactly is Holotropic therapy? Holotropic therapy, also known as holonomic integration, is a method of achieving an altered state of consciousness without the use of drugs. How does it work? This is accomplished through hyperventilation, which involves forcing a person to breathe deeply and rapidly for several minutes. Grof's technique causes pulmonary hyperventilation. It is also accompanied by music and some verbal guidance from the facilitator. To facilitate the alteration of consciousness, the subject is laid down with his or her eyes closed. This technique causes a decrease in carbon dioxide levels in the blood, which must be neither too

high nor too low. This sharp drop in carbon dioxide levels, in turn, causes a neurological crisis and acts similarly to a drug in the brain. This causes a crisis, which results in an altered state of consciousness and allows for the study of the individual's consciousness from that new state. Stanislov Grof (1994) makes use of this state of consciousness's experiential healing power.

HOLOTROPIC BREATHWORK

If psychoanalysts studied dreams, Grof studied the induced hallucinatory or psychedelic states (1994). Consider the parallelism between dreams and hallucinations. The dreams that so keenly study psychoanalysts have certain characteristics. First, the symbolism. What we dream is pregnant with symbols. It is a symbol in itself, has symbolic power, and can be interpreted as a symbol. As a way of seeing things here, we can also apply the concept of David Bohm (1990). The dream is the expression, while it is the symbol of what is behind the subconscious, of what is hidden, what is involved. It is a holographic way of saying that everything is in everything; the dream contains everything that symbolizes all that is behind. Any dream in a way symbolizes your internal world, this is the power and meaning of dreams.

Moreover, the second characteristic of dreams is the condensation of ideas or symbols. Symbols can be presented together and condensed in a dream to represent only one integrated idea while each symbol can represent different and independent ideas. This world of condensation also senses that it has something to do with the holographic; that we have discussed with the expression of "all in all" is also a feature of this condensation and must be partly based on it. This condensation of ideas, symbols, is the second feature of a dream; namely, the mishmash of various symbols and each symbol can represent several things well.

The third characteristic of a dream is Freud's discovery (1978) that in them, the sublimation of desires is poured. The dream is the fulfilment of a subliminal wish or even the threat. Sometimes the dream is a threat. It would seem that even on a greater number of occasions. The dream is then a threat than we previously feared, or it represents the realization of a traumatic event.

Under the guidance of Stanislov Grof (1994), psychedelic states have very similar characteristics to dreams. The first feature is its symbolic character. Obviously, they have symbolic, like dreams that are its foundation character. While it is noteworthy that many times we find more than symbols, we find experiences of real events that were, are or will be, and with which the subject identifies in an authentic journey of the mind to the implicate order.

The second feature is condensation, as in dreams, condensation of experiences, so that Stanislav Grof speaks of condensed experiences or “coex” for short (“condensed experiences”). Sees many memories from different periods of life, at all levels, are mixed. In any psychedelic state, we can find biographical material which may relate to traumas, perinatal issues, transpersonal materials; They may appear as paranormal topics related to reincarnation, animal identification issues, mythological sequences, *etc.*

All this, as we say, in condensed states “coex”. The third characteristic of psychedelic states is the role of the traumas of life. As conventional psychology, especially psychoanalysis, usually has great value in the trauma of separation from the mother, all focused through the Oedipus complex, in the experiential work with altered states of consciousness are particularly appreciates the danger of being killed. For example, as we said earlier, psychoanalysts would value in a sick child the problem of their separation from the mother; by contrast, in the experiential techniques, holotropic work is the importance of a child, for example, has had pneumonia and see your life in danger. By this way of assessing the trauma of the feeling of the danger of life, Stanislav Grof (1994), passes especially study the birth trauma. Grof particularly appreciates the birth trauma, the trauma of a child leaving the womb.

HOLOTROPIC BREATHWORK STUDIES AND MODELS

This study has a previous history, which began with Otto Rank (1929), which long preceded the discoveries with LSD. It was the time of Freud, who also met and agreed with the psychological trauma of birth, although for Freud, sexual dynamism was most important. Otto Rank explains that birth trauma is the source of anxiety and primary repression, as it somehow begins at that time and sets symbolically a central conflict between the desire to return to the uterus and fear to do . In this scheme, the birth trauma is a symbol and, similarly, desire or fear of returning to the womb. It seems that all serve as images and each of them, every moment of our life, is a symbol of personality; for example, at birth, but every moment of our lives can serve as a symbol of personality. For some mystical traditions know the principle: “While All is in THE ALL, it is especially true that the all in all.”. When someone is talking now, somehow, at this moment, this symbolizes his entire life. When each of us is listening now, we can say that this moment of each, in some way, represents your whole life.

We will study the findings of Stanislav Grof (1994) on these states, these perinatal experiences, and these traces the birth, these footprints of everything that happens at the time of birth of each person. What they are called perinatal matrices. We will study the perinatal matrices as Stanislav Grof (1994). The divided into four

Neurotechnologies

Abstract: For decades, altered states of consciousness have been used as a form of psychotherapy in transpersonal psychology. Although there are well-known techniques for inducing altered states of consciousness, such as holotropic breathwork, neurotechnology provides an alternative method for not only generating these states for transpersonal therapy but also for measuring the level of a state of consciousness. The goal of this chapter is to provide a review of the fundamental concepts of neurotechnology as well as the technologies that can be used to induce and measure altered states of consciousness for transpersonal psychotherapy.

Keywords: Altered states of consciousness, Biofeedback, Neurotechnology, Transpersonal therapy.

INTRODUCTION

There has been a surge in interest in neurotechnological devices since the publication of Michael Hutchison's classic text "Megabrain" in 1986. (1986). Aside from neurotechnological machines, the industry has developed a wide range of related devices, including peripherals tapes, subliminal tapes, hypno-peripheral processing, sound meditation devices, and altered state induction software programs for personal computers, among others. Although the combination of neurotechnology and modern psychology appears to be revolutionary, its roots are much older, as humanity has previously attempted to integrate consciousness with technology. The ancient practice of lighting a fire to induce trance can be traced back to the use of flashing LEDs in a light and sound machine. Brain entrainment sound recordings are undoubtedly derived from ritual singing and the shamanic use of wind instruments.

Biofeedback experiments resulted in the work of some consciousness researchers, such as Masters and Houston (1966), who developed the AVE (an abbreviation for Audio Visual Environment), one of the first electronic brain entrainment devices ushering in the current era of neurotechnology. The AVE was the first device to use visual and auditory stimuli to alter consciousness. The AVE, like many other audiovisual devices today, was made up of a wrap-around screen and headphones that bombarded the senses with these two stimuli.

These signals, produced by AVE devices and detectable by electroencephalogram (EEG) tests at specific frequency ranges, appear to alter the states of consciousness of their users. Neurotechnology products appear to allow the brain to “tune” to these various alternating frequencies and, as a result, achieve new psychological states. When we “tune in” to these frequencies at a slower rate, our thought processes and central nervous system are altered, resulting in the brain entering a deep state of activity. Furthermore, when tuned to a faster and higher frequency range, wave activity can be extremely stimulating to the brain.

Transpersonal psychology has employed altered states of consciousness as a form of therapy for modern psychological paradigms (Valverde, 2015). Although several techniques are used to induce these altered states of consciousness, such as holotropic breathing, terotechnology provides a more manageable alternative to transpersonal therapies.

The term “Neuro” refers to any type of technology that advances our understanding of the brain. Despite the fact that neurotechnology is still in its infancy, the most significant advances have been made in the last 30 years. The US government even dubbed the 1990s the “Decade of the Brain.” The introduction and widespread use of brain imaging techniques, such as MRI, CT, and PET (Positron Emission Tomography), among others, can be the reason behind this accelerated development. Some of these techniques initially provided only structural information of the brain, but technological advances have enabled us to study brain dynamics.

ASC AND NEUROTECHNOLOGIES

People have experimented with and published research on altering brain activity for decades. Researchers and scientists have amassed a vast amount of relevant data pertaining to the manipulation and influence of brain waves and states of consciousness. German scientists discovered the Ganzfeld effect (Fig. 17) in the 1930s (Hyman 1985). It is a visual effect in which the eyes are exposed to a completely uniform visual field with no edges, color changes, or movement. This effect can be produced by looking up at the sky on a clear, cloudless day or by wearing specially designed illuminated glasses. It affects the brain's circuitry, which is constantly scanning the visual field for edges and movement. Because the eye responds primarily to changes, when visual sensations are turned off and the brain finds nothing, the subject cannot tell if his eyes are open or closed. This is a case of altered consciousness caused by a shift in brain waves to theta.



Fig. (17). Ganzfeld effect.

For centuries, people have been aware of the effects of flickering light stimulation. To achieve a trance state, ancient shamans used flickering lights, which was a key component in developing spiritual practices in a wide range of ancient cultures. Around 200 A.D., Ptolemy noted in the common-era literature that the flickering of sunlight seen through the spokes of a spinning wheel could cause patterns and colors to appear to the observer, producing a feeling of lightheadedness and euphoria. With the advent of modern times (the 1940s and 1950s), neuroscientist W. Gray Walter's research became available (Walter and Walter 1949). Walter used a strobe light to create flickering light stimulation, noting that the cortex's brain wave pattern—just the area associated with the vision—changed. Since the adrenaline rush caused by dancing around the tribal fire, scientists, researchers, and ancient religious practitioners have sought to induce relaxation and altered states by influencing the vibrational frequency of brain waves. The use of technology is a modern attempt to make desired changes in the functioning of the brain, resulting in states of well-being and health.

MONROE EFFECT, BINAURAL SOUNDS, AND OTHER SOUND MACHINES

Robert Monroe, one of the most prominent figures in neurotechnology, particularly in the field of sound with neurological efficiency, devised the HEMI-SYNC method (Synchronization of the cerebral hemispheres by means of sounds). Like a glass resonates when a pure tone is emitted, the brain resonates when it receives certain frequencies of waves and is synchronized with these waves (similar to the previous effect with flashes of light). This effect is known as FFR (Frequency Following Response) (Response a frequency tracking).

Machines based on FFR became popular, with the typical machine based on the Monroe principle using stereo headphones that are used to send sound signals to each ear, for example, 300 and 304 Hz. Only the 300 Hz signal will be heard in

CHAPTER 10

The Induction and Measurement of the Altered States of Consciousness by using Neurotechnology and Biofeedback in Transpersonal Therapy

Abstract: Transpersonal psychology is the study of human nature that begins with the assumption that humans have potentials that go beyond the limits of their ego and integrate spiritual experience into a broader understanding of the human psyche and consciousness. For decades, altered states of consciousness have been used as a form of psychotherapy in transpersonal psychology. Although there are well-known techniques for inducing altered states of consciousness, such as holotropic breathwork, neurotechnology provides an alternative way to not only induce these states for transpersonal therapy but also for other purposes. Biofeedback may also be used to assess the level of consciousness. The goal of this article is to provide a review of the key concepts in neurotechnology, as well as the key technologies that can be used to induce and measure altered states of consciousness for transpersonal psychotherapy.

Keywords: Altered states of consciousness, Biofeedback, Neurotechnology, Transpersonal therapy.

INTRODUCTION

The most common criticism levelled at studies of altered states of consciousness is that they are hoaxes or some form of mental delusion. For years, Eastern yogis claimed to be able to control parts of the nervous system and the body, such as heart rate, blood pressure, hormone secretion, and so on. These claims were thought to be impossible by western scientists, whose theories and personal experience ruled them out.

Many of the claims made by physicist yogis, particularly that the state of consciousness can be changed at will by changing the sound pattern, have been proven true through biofeedback research. EEG measurements have been based on research and theories developed from the early work of Adrian and Matthews (1934), who discovered that the brain could go to certain frequencies with electronic brain stimulation; this work led to the discovery that various frequencies were linked to different psychological states (Kamiya, 1968); and

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finally, the work of Green *et al.* (1970) demonstrated the sensitivity of the brain to different frequencies. These tests were the first to demonstrate how the brain can boot, much like a computer with the correct input frequency.

BIOFEEDBACK AND THE ALTERED STATES OF CONSCIOUSNESS

What exactly happens neurologically when we enter alternate states of consciousness is still unknown. This gap in our understanding of these realities is largely due to deficiencies in both research tools and philosophies used by scientific research, as well as society's general reluctance to accept such states as real. Understanding how our brains create the bridge to stimulate altered states of consciousness is important within the traditional scientific practice, but understanding it tells us little or nothing about the correlation with psychological phenomena with which we are able to interpret altered states of consciousness. This inner cosmological view, or its representation of our quantum reality, is what we are dealing with.

Once we accept this premise as our primary metaphor for altered states of consciousness, we can hypothesize that our brainwave frequencies are measurement indicators of our psychological states and correspond to the various ways in which we produce consciousness. In other words, these frequencies are the building blocks of our quantum reality. This is how we create the reality that we perceive, this is based on the Heisenberg principle which states that our fields are a unified experience of the frequencies perceived by our brains.

According to Cade and Coxhead (1979), who conducted EEG tests on 70 subjects and measured the ESR (electrical resistance of the skin), they were able to build the table below that represents the objective and subjective correlates of these states by applying their results to the work of Terry Lesh (1970). Level 5 represents a state of altered consciousness (Table 4).

Table 4. States of consciousness and frequency measurements.

Level	Consciousness	Measured Frequency	Types of Waves
0	He is just beginning to relax with difficulty, quieting the mind.	25-20	Alpha and beta
1	A not very clear conscience or sense of anesthesia	20-16	Guests beta alpha continuous
2	Calm and relaxed with flash back memories	16-13	Alpha continues without beta theta intermittent

(Table 4) cont....

Level	Consciousness	Measured Frequency	Types of Waves
3	Well-defined state. Feeling of floating with increased imagination and more concentration sustained	13-10	Alfa falling Continuous theta
4	Extremely vivid awareness of breathing, heartbeat, or other bodily sensations. Living consciousness. Sometimes an alternation of internal and external awareness	10-8	Alpha continuous theta falling frequency
5	Awareness with satisfaction and deep intense alertness and calmness and detachment. Feeling of the altered state lacking in previous levels 0 to 4.	8-5	Theta continuous alpha close to theta
6	A new way of feeling by intuitive vision synthesis of opposites in a higher unity	below 4	Delta occasionally

NEUROTECHNOLOGY AND THE ALTERED STATES OF CONSCIOUSNESS

Penfield and Perot (1963) developed a study in which a series of what was called in those days outside the body psychic visions emerged not only in his epileptic patients but also in patients who were on the operating table and had the surface of the brain stimulated. In one case study, one of his epileptic patients saw God descending from heaven.

Persinger performed an important step in the development of neurotechnology (1983). To speak of Michael Persinger is to speak of a scientist who has devoted himself to the analysis and study of “paranormal events”. This cognitive neurologist, born in the United States in 1945, was particularly interested in phenomena that remained in the shadow of ignorance and mysticism. It was thus that he developed particular experiments such as the “Helmet of God”, where he has shown a physiological correlate of abnormal experiences.

Persinger believed that both religious and paranormal experiences could not be simple hallucinatory phenomena. On the contrary, he believed that there was a brain response matrix that induced states prone to perceptual disturbances. Persinger received his doctorate in 1971 at the University of Manitoba, Canada, the country where he would develop his academic activity and where he would end up dying in 2018 (Saroka *et al.* 2010).

Laurentian University's neuroscience program is directed by Persinger. Persinger (1983) is able to induce visions of God and other religious and mystical experiences in the laboratory by using a computer and what he refers to as the Koran helmet, also known as the God helmet. His most significant contribution to

CHAPTER 11**A Biofeedback and Neurotechnology Cybertherapy System for the Support of Transpersonal Psychotherapy**

Abstract: Transpersonal psychology is the study of human nature that is based on the assumption that humans have potentials that go beyond the limits of their ego and integrate the spiritual experience into a broader understanding of the human psyche and consciousness. Transpersonalists have used altered states of consciousness to aid psychotherapy for decades. To support transpersonal psychotherapy, a cyberpsychotherapy system is proposed. The system can be used to induce a non-ordinary state of consciousness, which transpersonal psychologists can use as a healing tool to treat patients suffering from psychological issues, such as psychosis. These treatment sessions can take place over long distances thanks to internet technology. The cyberpsychotherapy system employs a quantum signal generator to induce altered states of consciousness, which is based on Persinger's Koren Helmet (1983). This therapy includes an EEG that acts as a biofeedback device to determine if the patient has reached the desired level of consciousness. Furthermore, this EEG measurement can be used to inform the adjustment of the signal generator frequency to improve the patient's psychotherapy experience, if necessary. The cybertherapy system based on neurotechnology and quantum biofeedback was tested on ten patients. To confirm the system's efficacy, data was collected and analyzed. Although the results show that the patients were unable to achieve the desired level of consciousness for the psychotherapy, there was statistically significant evidence that the proposed system can alter an individual's level of consciousness, which may help inform future designs aimed at inducing the most conducive state of consciousness for psychotherapy.

Keywords: Altered states of consciousness, Biofeedback, Neurotechnology, Transpersonal therapy.

INTRODUCTION

Cybertherapy is a computer-mediated system that uses the internet to facilitate psychotherapy (Botella *et al.*, 2009). This includes new technological applications in psychology and healthcare that use augmented and virtual reality components to facilitate effective psychotherapy (Botella *et al.*, 2009). Although the literature contains numerous cybertherapy systems (Takacs, 2005), none of them address

transpersonal psychotherapy or are based on quantum biofeedback technology. Based on transpersonal research and theory, transpersonal psychotherapy considers the psyche to be multidimensional and is composed of several “levels of consciousness,” each with different characteristics governed by different laws. Transpersonal psychology is the study of human nature and development that is based on the premise that humans have potentials that exceed the limits of normal ego development. Transpersonal theory's main goal is to integrate the spiritual experience into a broader understanding of the human psyche and consciousness (Grof, 1988).

The trend of explaining consciousness using quantum theories has gained popularity in recent years, and while many neuroscientists are clearly opposed to it, more and more researchers are turning to quantum explanations (Valverde, 2016). Brian D. Josephson (1962), of the University of Cambridge, winner of the Nobel Prize in Physics in 1973 for his studies on quantum effects in superconductors (Josephson effect), proposes a unified field theory of quantum nature that would explain not only consciousness and its attributes but also the phenomenology observed to date in terms of psychological and mystical experiences. The human being experiences various altered states of consciousness, which means that consciousness can be altered in various ways. According to Stanley Krippner (2000), altered states of consciousness are mental states that can be subjectively recognized by an individual or objectively observed as being different in mental functions, the normal state of the individual, and alertness and waking states.

Transpersonal therapists have used altered states of consciousness as an adjunct to psychotherapy. One of these techniques, Holotropic breathwork, is created using a hyperventilation technique, instructing the individual to breathe deeply and rapidly for several minutes. Grof (1988) uses this technique to cause a homeostatic crisis, which results in an altered state of consciousness, allowing meaningful subconscious content and self-insights to emerge from that new state. Stanislaw Grof (1988) treats his patients with the experiential healing power of this new state of consciousness. Although holotropic breathwork induces these altered states of consciousness, quantum biofeedback and neurotechnology provide an alternative way to induce altered states of consciousness for transpersonal therapy that can be easily implemented using quantum computer technology and used in conjunction with the internet to facilitate online transpersonal therapy (Valverde, 2015).

Sensors in computer-based biofeedback monitor physiological relaxation indicators, such as skin temperature and muscle tension. It extends traditional biofeedback by combining galvanic skin response (GSR) and modern computer

technology to detect the response of the built-mind-spirit body (also known as the super-conscious) to a wide range of stress indicators.

Biofeedback interacts with the body's cellular matrices, allowing communication between conscious and unconscious levels (Valverde 2015). This is accomplished by establishing electrical communication with the patient *via* 12 electrodes attached to the patient's head, wrists, and ankles. A calibration procedure is then used to create a loop and cyber handshake between the bio feedback System and the patient. By connecting in this manner, all 200 billion cells in the human body are included in the information exchange. On this basis, it is now possible to identify and prioritize the major stressors and toxins and bring them into balance (Valverde, 2015a).

Classical biofeedback is based on frontal cortex electroencephalographic (EEG) measurements. This EEG data is presented to the user, who then attempts to consciously change their internal reactions in order to change their brainwave state. Computer-based biofeedback connects the user's reactions to all cell matrices in the body, not just the conscious ones. As our conscious perception of the world is limited by design to 17 percent of the stimulation we receive, this allows us to gain a better understanding of health (Valverde 2015a).

Persinger experimented with quantum physics (neurotechnology) in altered states of consciousness (1983). Persinger was able to induce visions of God as well as other religious and mystical experiences in the laboratory by using a computer and what he called the Koran Helmet, also known as the Koren helmet. The Koren Helmet was originally known as the Koran Helmet, after its creators, Stanley Koren and Michael Persinger. He discovered that the temporal lobes of the brain are the origin of the majority of spiritual experiences and other states of consciousness.

This Koren helmet is a device for inducing altered states of consciousness by using weak magnetic signals to direct brain activity that can induce spiritual experiences that aid in transpersonal exploration and transformation of many people, who can heal as a result of these transpersonal experiences (Persinger *et al.*, 2000). It is proposed that altered states of consciousness, such as sensed presence and out-of-body experience, can be most effectively explained as changes in the relative contents and/or intensities of the test subjects' neural quantum entanglement with their surroundings, including possibly spiritual surroundings, whether produced by magnetic, electrical, or other stimulations or circumstances (Hu and Wu, 2012).

People can discover hidden deep events and conflicts in their subconscious using biofeedback and neurotechnology, which can lead to healing experiences. The

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