



THE INTERNATIONAL JOURNAL OF PSYCHOSOCIAL AND CULTURAL GENOMICS CONSCIOUSNESS & HEALTH RESEARCH

New Look In Psychology:
The Psychosocial And Cultural Genomics

A Quantum Field Theory Of Life And Consciousness:
The Quantum Heat Engine Of Psychosocial Genomics

The Neuroscientific Evolution Of Ericksonian Approach
As A Metamodel Of Healing

My Reflections On The Canoe Journey That Expanded A
Young Man's Consciousness, Paving The Way For His Future
Therapeutic Strategies

The Beginner's Mind
The Collected Works Of Milton H. Erickson

Psychology In Black And White:
The Project Of A Theory-Driven Science

How The Real World Is Driving Us Crazy!

Editorial

This editorial starts from the consideration that in many cases the different levels of our functioning have been distant or totally separated one from the other. This happens because they have been often the result of methodological and/or epistemological limits which have led the disciplines and/or the different approaches in those ones to develop languages and practices based on a monologic approach. Basically this way of proceeding in knowledge offered a great specialization in the different fields of knowledge but sometimes it overlooked the complexity of difficult subject of research such as human functioning.

An evidence of this is certainly the omission of the body actualized by a certain part of psychology as well as the symmetrical amnesia realized by medical science regarding the existence of Mind.

[...]

Mauro Cozzolino



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EDITORIAL

- 4** New Look In Psychology:
The Psychosocial And Cultural Genomics

Mauro Cozzolino

PSYCHOSOCIAL AND CULTURAL GENOMICS

- 6** A Quantum Field Theory Of Life And Consciousness:
The Quantum Heat Engine Of Psychosocial Genomics

Ernest Rossi and Kathryn Rossi

NEUROSCIENCE RESEARCH

- 31** The Neuroscientific Evolution Of Ericksonian Approach
As A Metamodel Of Healing

Mauro Cozzolino and Giovanna Celia

POINT OF VIEW

- 42** My Reflections On The Canoe Journey That Expanded A Young Man's
Consciousness, Paving The Way For His Future Therapeutic Strategies

Marilia Baker

INTERVIEWS AND REVIEWS

- 44** The Beginner's Mind
The Collected Works Of Milton H. Erickson

Richard Hill

BOOKS

- 46** Psychology In Black And White: The Project Of A Theory-Driven Science

Antonio De Rosa

- 48** How The Real World Is Driving Us Crazy!

Antonio De Rosa

NEW LOOK IN PSYCHOLOGY: THE PSYCHOSOCIAL AND CULTURAL GENOMICS

A multi-level perspective integrating different levels' analysis

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This editorial starts from the consideration that in many cases the different levels of our functioning have been distant or totally separated one from the other. This happens because there have often been the result of methodological and/or epistemological limits which have led the disciplines and/or the different approaches in those ones to develop languages and practices based on a mono-logic approach. Basically this way of proceeding in knowledge offered a great specialization in the different fields of knowledge but sometimes it overlooked the complexity of difficult subject of research such as human functioning.

An evidence of this is certainly the omission of the body actualized by a certain part of psychology as well as the symmetrical amnesia realized by medical science regarding the existence of Mind. Each of these aspects has always been so reluctant to understand and use the perspective of the other in order to heal this fracture. However, today the limits of an increasingly compartmentalized perspective based on the absence of dialogue among models, approaches and methods, in addition to the crisis of replication in psychology, are leading us toward a new concept of research and intervention in psychology. So we need a new look in psychology founded on a multi-level perspective (Kandel, 1998, Rossi et al. 2006). The advent of new extraordinary technologies in the various fields of knowledge is able to create a more concrete meeting among the different ways of doing research. In this context of change, new ways of reading and interpreting the functioning of both human beings and groups are also becoming evident. For the first time psychology, medicine, as well as the world of education, social issues and culture can take into account as central issue the complexity of human beings with its numerous variables and multiple levels of analysis. In this new scientific phase, psychology can play a role of great importance, especially if it leaves out the tendency of defending the status quo and proceeds toward a scientific-disciplinary evolution more suitable to the complexity of its purpose of study). After having acquired the constitutive

limit of a merely cognitive-behavioral approach and recognized the inestimable value of a socio-cultural perspective with regard both to the epistemology and to the intervention, psychology is getting ready for a possible integration among models and levels of functioning. The purpose is not to conform or deny the differences among approaches, models and languages but rather to try and hold this epistemological and operational complexity together. During other moments of its history, Psychology has already offered a unitary reading of the different levels of analysis (Lewin, Bronfenbrenner, Doise, etc.) in relation to our behavior and development. But it was a theoretical elaboration which did not find an active methodological implementation based on clear, direct and experimental evidences that could highlight the points of convergence among the different levels of our functioning. Only now for the first time, thanks to methodologies such as the Functional Magnetic Resonance Imaging and methods such as the DNA microarrays, we are able to imagine a relation between Mind and Body in its deepest meaning, see gene expression and protein synthesis. This new scientific approach (from Mind to Gene and vice versa) allows us to identify in an objective and functional way the influences that certain levels of functioning can have in real time between one and another in relation to the processes of memorization, learning, making sense and construction of knowledge, with reference to the world of education. While extraordinary scenarios are appearing also in health research, consider the relevance this approach can have in the world of clinical psychology and mind-body therapies. This new perspective in psychology is supported by evidences and tangible results which give it a value of great relevance especially for the future. Our journal's project aims to highlight that on a both epistemological and methodological level it is possible not only to imagine a psychology which takes into account different levels of analysis, but also that this would allow our discipline to overcome the inferiority complex about other

sciences or approaches considered more exact, without imitating something that does not belong to us and that would misrepresent our story and our identity.

This new approach in psychology can be well represented by Psychosocial and Cultural Genomics (Rossi, 2002, Rossi et al. 2006; Cozzolino et al. 2015).

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A QUANTUM FIELD THEORY OF LIFE AND CONSCIOUSNESS: THE QUANTUM HEAT ENGINE OF PSYCHOSOCIAL GENOMICS

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Abstract

We propose a new quantum field theory (QFT) for an emerging psychology of consciousness and cognition for optimizing health and wellness. This quantum field theory of psychosocial genomics facilitates creative consciousness, gene expression, brain plasticity and expectancy in the top-down approaches to mind/body therapy. The advent of current research in the quantum biology of life and consciousness is now generating an enlightened horizon for the pursuit of STEM education (Science, Technology, Engineering and Math). Quantum field theory brings together a variety of interdisciplinary fields ranging from stress reduction, psychosomatics, psychoneuroimmunology, meditation and mind-

body medicine to the deep quantum psychobiology of optimizing human performance and well-being. Research in the quantum dynamics of particle physics, biology and psychology is proposing the ultimate hypothesis about how our continually expanding universe is a quantum heat engine (QHE) that underpins the life energy equations of cosmos and consciousness. Innovative psychosocial genomic research on all levels from mind to gene is clarified and recommended for formulating the scientific foundation of a quantum field theory of psychology, consciousness and creativity characteristic of life systems in ancient and modern approaches to self-care and healing.

An Introduction to A Quantum Field Theory of Psychosocial Genomics

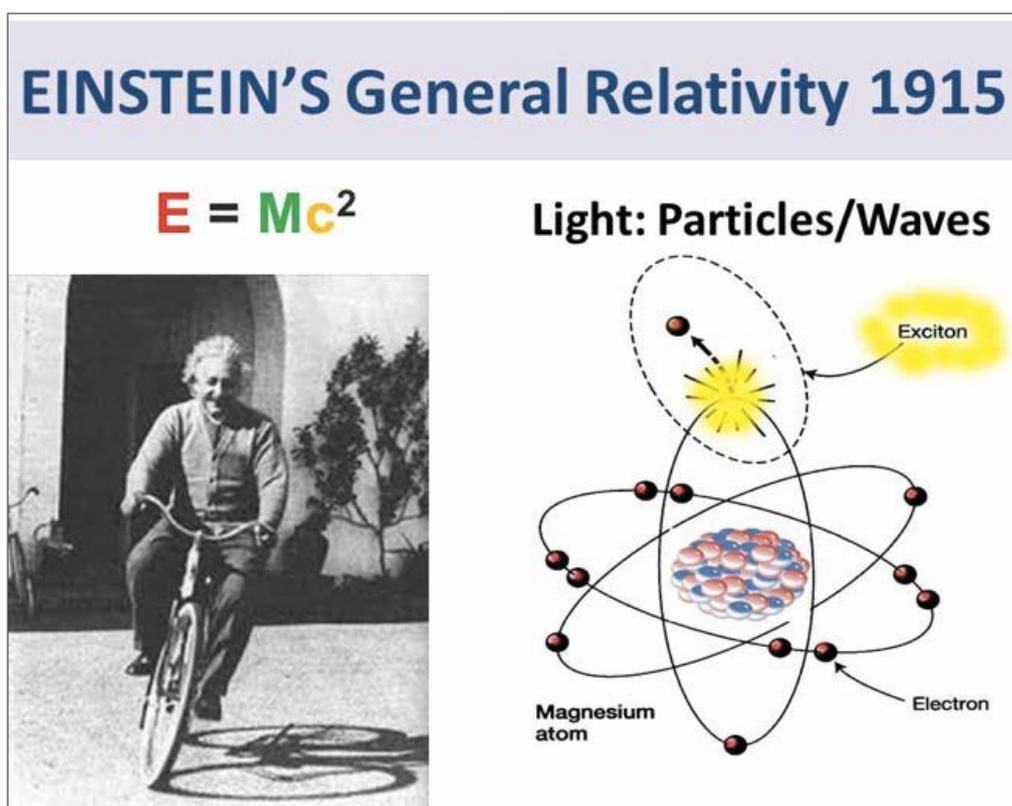


Figure 1. A playful Einstein illustrating angular momentum (circles) in the Classical/Quantum interface of a STEM (Science, Technology, Engineering & Math) Quantum Field Theory of Life, Consciousness and Cognition. Notice how the classical curve of angular momentum of Einstein's Bike appears to be a STEM amplification of the curves of angular momentum in visualizing the quantum dynamics a photon of light generating an Exciton in a magnesium atom (McFadden & Al-khalili, 2014).

In 2016 we celebrated the centennial of Einstein's General Theory of Relativity, which is expressed in his iconic equation: $E = Mc^2$ (Energy equals Mass times the speed of light squared). On the one hand this equation has been associated with the development of the atomic bomb. On the other hand, it has inspired profoundly new insights into the quantum nature of life, death, health and perhaps consciousness itself. The birth of our current age of quantum physics, biology and psychology has opened entirely new ways of understanding nature that goes beyond traditional texts and journals (McFadden, 2000; McFadden & Al-khalili, 2014).

Of all the so-called "strangeness and weirdness" of the early theories of quantum mechanics none

the psychology of consciousness, cognition and well-being. Inspiration for understanding Quantum Field Theory (QFT) can be found in the new text for students by Lancaster and Blundell (2014) with their very first words on page one.

What is Quantum Field Theory?

Every particle and every wave in the Universe is simply an excitation of a quantum field that is defined over all space and time.

This remarkable assertion is at the heart of **quantum field theory**. It means that any attempt to understand the fundamental physical laws governing elementary particles has to first grapple with the fundamentals of quantum field

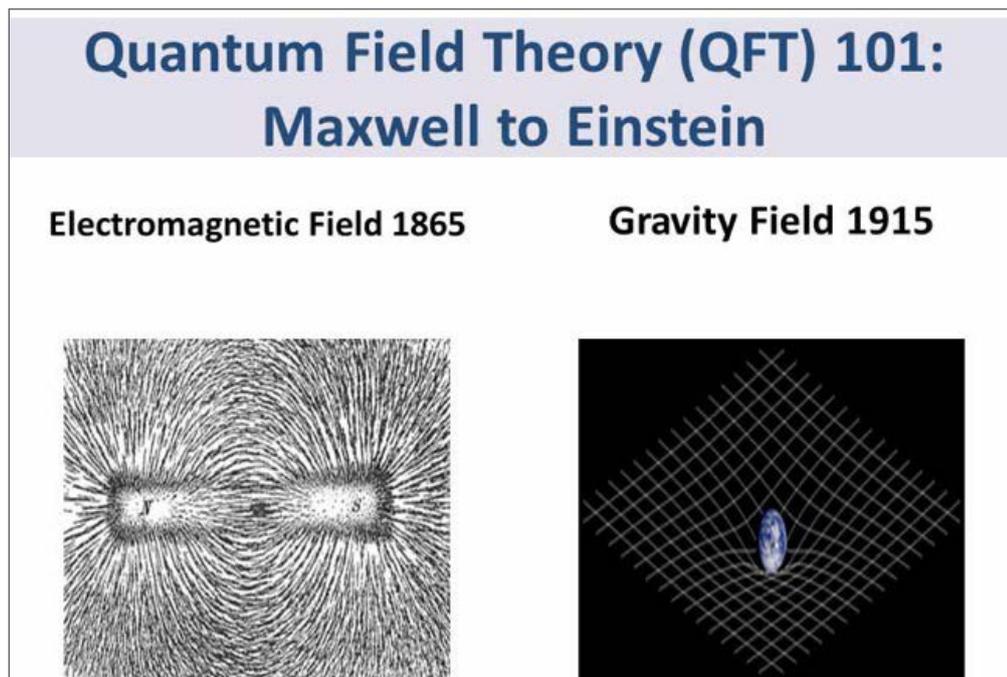


Figure 2.
The origin of the Quantum Field Theory in Maxwell's Electromagnetic Field Theory.

seemed more paradoxical than the apparently dual nature of light as both a particle and wave. It has taken scientists a bit more than 100 years to resolve this apparent paradox experimentally and mathematically. This is now epitomized by the new concept of light as a *quasiparticle* in *Quantum Electrodynamics (QED)*, *The Strange Theory of Light and Matter* (Feynman, 1985). This is especially true of the quantum concept of the *exciton*, which manifests the dual nature of light as a quasiparticle in *Quantum Field Theory (QFT)* that explores the evolution of life and consciousness in a scientific manner, which now engages us in one of the most tantalizing intellectual adventures of our time. Let's join Einstein's playful bike ride and begin with a bit of the history QFT 101.

Quantum Field Theory (QFT) is currently emerging as the conceptual and mathematical successor to quantum electrodynamics (QED) in the life sciences. This is particularly true in its applications to the life sciences such as biology and

theory. It also means that any description of complicated interacting systems, such as are encountered in the mind-body problem [cosmos, consciousness and cognition] will involve quantum theory to properly describe the interactions ... In any case, quantum field theory is the best theory currently available to describe the world around us, and in a particular incarnation known as quantum electrodynamics (QED), is the most accurately tested physical theory ... The ideas making up quantum field theory have profound consequences ... *Interactions in quantum field theory involve products of operators which are found to create and annihilate particles and so interactions correspond to processes in which particles are created or annihilated; hence there is also the possibility of creating and destroying virtual particles which mediate forces* (p. 1, italics added here).

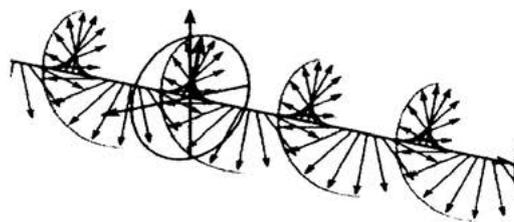
We could do an interesting Einstein thought experiment with this quote by replacing the word "Field" with "Consciousness," the word "Particle" with "Person" and the word "Interaction" with "Relationship." This would suggest a new quantum inspired perspective for amplifying Lancaster and Blundell's mathematical overview of quantum field theory from physics to new applications in biology and psychology. We will begin this thought experiment with an overview comparing and contrasting the *physicist's outer world view of objective quantum reality with the psychologist's inner world view of subjective quantum reality described as QBism* by Fuchs (2001, 2010, 2011, 2012). We have

previously illustrated how Dirac's quantum bra-ket math notation could be applied to the problems of the human consciousness and cognition as we experience them in the psychodynamics of everyday life, dreams and psychotherapy (Rossi & Rossi, 2014 a, b, 2015). We now use Box One to outline Maxwell's four classical equations of electricity (**E**) and magnetism (**H**) to propose an updated Quantum Field Theory of physics, biology, psychology and its applications to research in consciousness, cognition, and the traditional mind/body therapies such as meditation, mindfulness and naturalistic therapeutic hypnosis.

**Box One: A STEM Review of the Maxwell Electromagnetic Equations:
A Quantum Field Theory of Naturalistic Therapeutic Hypnosis**

$$\begin{array}{ll} \nabla \cdot \mathbf{E} = 0 & \nabla \times \mathbf{E} = - \frac{1}{c} \frac{\partial \mathbf{H}}{\partial t} \\ \nabla \cdot \mathbf{H} = 0 & \nabla \times \mathbf{H} = \frac{1}{c} \frac{\partial \mathbf{E}}{\partial t} \end{array}$$

This STEM review of Maxwell's (1871) classical four equations of electromagnetism is updated with current mathematical notation (Stewart, 2012) to clarify the essential dynamics of the quantum field theory of therapeutic hypnosis (Ravitz, 1950, 1962, 2002). The two equations on the left illustrate the *Divergence Operator* in mathematics, which the authors propose as corresponding to the *Dissociation in Hypnosis*. The two equations on the right illustrate the *Curl Operator* in mathematics, which the authors propose as corresponding to the *Convergence and Focusing of Attention, Consciousness, Cognition and Expectancy in Hypnosis*. Notice how the balanced symmetries between electricity (**E**) and magnetism (**H**) in these four equations tell a story about the nature of *electromagnetism*. A modern visualization of Maxwell's 4 equations as a wave or flow of electromagnetism is typically illustrated as the cyclic integration of the divergence and curl operators. The electromagnetic field is visualized as a self-propagating twisting braid of electric and magnetic energy flowing apart (dissociation) and curling back together (re-association) in the quantum field theory of observer/operator dynamics in therapeutic hypnosis (Image from Wikipedia).



The electromagnetic field is visualized as a self-propagating twisting braid of electric and magnetic energy flowing apart (dissociation) and curling back together (re-association) in the quantum field theory of observer/operator dynamics in therapeutic hypnosis (Rossi & Rossi, 2014, 2015 a & b).

Box One. A STEM Perspective of Maxwell's four classical equations of electromagnetism applied to the psychodynamics of consciousness and cognition in the calculus of dissociation and re-association via naturalistic therapeutic hypnosis (Rossi, Erickson-Klein & Rossi, 2008-2015, Volume 1, The Nature of Therapeutic Hypnosis).

Maxwell's four electrodynamic field theory equations of divergence and curl in Box One are proposed in this paper to be the mathematical and physical basis of the psychological concepts of dissociation and convergent re-association in therapeutic hypnosis. When people experience a physical or psychological shock, for example, the delicate focus of their attention, consciousness, cognition and behavior tends to diverge or dissociate, which results in symptoms of post-traumatic stress disorder (PTSD). Therapeutic hypnosis can help people reintegrate what was dissociated with the curl or re-convergence and focusing of their attention, consciousness, cognition and expectancy. The integration of the languages of mathematics, physics, biology and psychology in Box One highlights the STEM (Science, Technology, Engineering and Math) perspective for updating the traditional theory, research and practice of therapeutic hypnosis meditation, mindfulness and many other mind/body therapies. This STEM perspective is motivated by the historical words of Galileo Galilei (1564–1642):

Philosophy is written in this grand book—I mean the universe—which stands continually open to our gaze, but it cannot be understood unless one first learns to comprehend the language in which it is written. It is written in the language of mathematics, and its characters are triangles, circles, and other geometric figures, without which it is humanly impossible to understand a single word of

it; without these, one is wandering about in a dark labyrinth.

Box One also illustrates the profound insight of Heinrich Hertz's words in applying Maxwell's four equations of electromagnetism to the physicist's mathematical understanding of everyday phenomena as diverse as the quantum visual field dynamics of the rainbow and the quantum auditory field dynamics of radio waves (Wilczek, 2002, 2008).

One cannot escape the feeling that these mathematical formulae have an independent existence and an intelligence of their own, that they are wiser than we are, wiser even than their discoverers that we get more out of them than was originally put into them. (Heinrich Hertz, 1857-1894, on Maxwell's Equations of Electromagnetism).

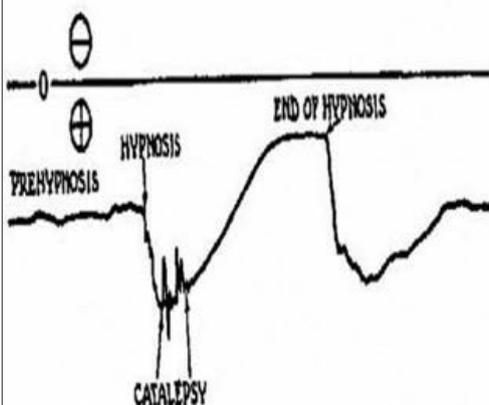
The STEM perspective is being extended in this paper to an exploration of how Quantum Field Theory (Klauber, 2015; Lancaster & Blundell, 2014) can unify the four fundamental forces of nature in the scientific foundation of physics, biology and psychology on many levels from mind to genes (Cozzolino et al. 2014a, b; Rossi et al. 2008; Rossi & Rossi, 2014a, b; Rossi, Erickson-Klein & Rossi, 2014, 2015). We will begin with an almost forgotten heritage of Milton H. Erickson MD and his student Leonard Ravitz MD in their early explorations of measuring the electrometric correlates of the hypnotic state (Rossi, Erickson-Klein, 2008-2015, *Volume 12, Experiencing Hypnosis*). We see this as the lost heritage and new horizon of psychosocial genomics.

The Lost Heritage and New Horizon of Psychosocial Genomics

Ravitz L (1950). Electrometric Correlates of the Hypnotic State. *Science*, 112, 341-342.

Burr-Lane-Nims Millivoltmeter
Harvard & Yale Medical 1922-1972

Ravitz 2002 *Electrodynamic Man*
Milton Erickson Technique



- [Wave Mechanics and Quantum Theory. . .](#)
- [Electrodynamic Factors Underlie Life \(p. 16\).](#)
- [Molecules of chemistry reduce to Electricity. . . To Quantum Fields \(p. 200\).](#)

Figure 3. The Measurement of the Electrodynamic Field Correlates of Milton H. Erickson's Naturalistic Therapeutic Hypnosis, originally published by Ravitz in *Science* in 1950, was initially conceptualized and explored as an early version of quantum field theory (QFT).

The theory, research and practice of the original quantum field theory of naturalistic therapeutic hypnosis is illustrated in figure 3. This measurement of the electrodynamic field correlates of Erickson's naturalistic hypnosis was published by Leonard Ravitz in *Science* in 1950. This naturalistic field theory of hypnosis was presented at the first meeting of *The American Society of Clinical Hypnosis* (ASCH) that coincided with the founding of *The American Journal of Clinical Hypnosis* (AJCH) in 1958. New technology is introduced in this paper to motivate more systematic research comparing the electronic monitoring of therapeutic hypnosis, biofeedback, meditation and mindfulness. Applications of the quantum electrodynamic field theory of naturalistic hypnosis for research on attention span, focusing of consciousness, cognition, chirality, dissociation, expectancy, meditation, psychodynamics and chronic post-traumatic stress disorder (PTSD) are now proposed in this paper for a new generation of students and clinicians.

trances, as opposed to formalized ritualistic procedures of trance induction, merits much more investigation, experimentation and study than have been accorded to date.

By naturalistic approach is meant the acceptance of the situation encountered and the utilization of it, without endeavoring to restructure it psychologically. In so doing, the presenting behavior of the patient becomes a definite aid and an actual part in inducing a trance, rather than a possible hindrance. For lack of a more definite terminology, the method may be termed a *naturalistic approach*, in which an aspect of the principle of synergism is utilized. (Italics added here, p.3)

Measurements of the electrodynamic field correlates of naturalistic hypnosis were originally published in *Science* (Ravitz, 1950). Milton H. Erickson's early student, Leonard Ravitz (2002)

Elizabeth Erickson Autohypnosis Recorded by Ravitz 10-10-1959

Northrop 1928 Macroscopic Atomic Theory; Burr Electromagnetic Fields

Erickson's Therapeutic Hypnosis Manifests an Electromagnetic Field

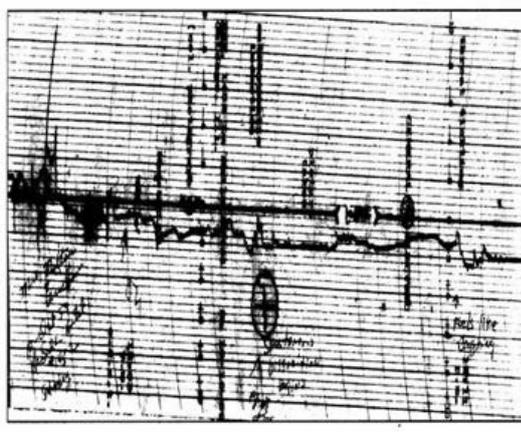


Figure 4. Archival images of Milton H. Erickson's wife, Elizabeth, who was an expert in autohypnosis, were published by Ravitz (2002).

The Quantum Electrodynamics Field Correlates of Naturalistic Hypnosis

The archival images in figure 4 illustrate pioneering research with Milton H. Erickson's wife, Elizabeth who was an expert in autohypnosis (Ravitz, 2002). The quantum electrodynamic field correlates of naturalistic hypnosis as reviewed here suggests how the theory, research and practice of Erickson's naturalistic hypnosis could be updated with a new STEM (Science, Technology, Engineering, and Math) perspective. Milton H. Erickson (1958) described the naturalistic techniques of hypnosis in the first issue of *The American Journal of Clinical Hypnosis* as follows.

The naturalistic approach to the problem of the induction of hypnotic

reviewed the original quantum electrodynamic field theory of naturalistic hypnosis and some of its sources as follows.

The field theory of hypnosis – proposed at the first annual meeting of the American Society of Clinical Hypnosis, Chicago, on October 3, 1958 as one of the basic factors in hypnotic states – derives from experimental knowledge of various factors and states which do and do not produce EMF [Electromagnetic Force] variations ... *Such observations are reinforced by the frequent spontaneous clinical manifestation of trance states ... involving this ancient brain core, further implicated by its potential control of physiologic survival functions via*

hypnosis – including the control of bleeding ... Briefly, all evidence suggests that profound alterations occur in the balance of the ancient centers with respect to the neocortex during hypnosis, with intact, or frequently improved neocortical functioning ...

Field monitoring of changing state-function, including hypnotic states together with their many manifestations, confirmed by Bartlett, Blagg, Rossi and Kost independently, has resulted in deductive considerations entailing the meshing of two radically disparate approaches: the Burr-Northrop field construct with its derivative instrumentation catalyzed by Maxwell and Gibbs, and a unified tripartite logic formalized mathematically ... [p. 90-91]

Furthermore, recent findings in wave mechanics and quantum theory at that time reduced chemical atoms to electrons and protons, implying that more fundamental electrodynamic factors underlie life. In short, atomic physics had to be supplemented

Medicine ... This was the first biological theory ... based on Einstein's relativity field physics and Maxwell's electromagnetic equations. ... An electrodynamic or electromagnetic field is a continuum of experimentally verifiable vector forces defined in terms of two parameters: magnitude or intensity, **E** and direction or polarity, **H**. [Ravitz, 2002, p. 3-4, italics added here].

During the middle 1970's, about 25 years after Ravitz's 1950 paper was published in *Science*, Erickson and Ravitz together mentored Ernest Rossi in the use of a more modern strip-chart recording electronic device (Heath-Schlumberger Model SR-255B) shown here for facilitating the induction and objective measurement of the depth of therapeutic hypnosis. We assessed real patients, ourselves and some of Erickson's family during this informal early training period, which was later documented nostalgically with many photographs, figures and tables of data in Ravitz (2002). Rossi subsequently attempted to identify an electronic signature

MHE, Ravitz & Rossi 1972-1980 Research Erickson & Rossi (1981/2014) *Experiencing Hypnosis*



Figure 5.
The paper strip-chart recording electronic device (Heath-Schlumberger Model SR-255B) for facilitating the induction and objective measurement of the depth of therapeutic hypnosis during the 1970s by Erickson, Ravitz and Rossi.

with field physics." (Ravitz, 2002, p. 16, italics added here) ... in fact, the entire concept of valence, reduce to electricity, and in this specific instance, to *quantum fields*." [Ravitz, 2002, p. 200]

The human body, then, is the product of an organizing field ... We owe this epochal discovery to the genius of two Americans, Filmer Stuart Northrop ... Sterling Professor of Philosophy and Law at Yale University ... and Harold Saxton Burr, Professor of Anatomy in Yale University School of

of Erickson's naturalistic approach to hypnotic induction and therapy illustrated below, which he outlined as a "Two-Factor Theory of Hypnotic Experience as follows (Erickson & Rossi, 1981/2014; Rossi, Erickson-Klein & Rossi, 2014, *Volume 12, Experiencing Hypnosis*).

Quantum 1-D Wave Nature of Consciousness? Erickson & Rossi (1981/2014) *Experiencing Hypnosis*

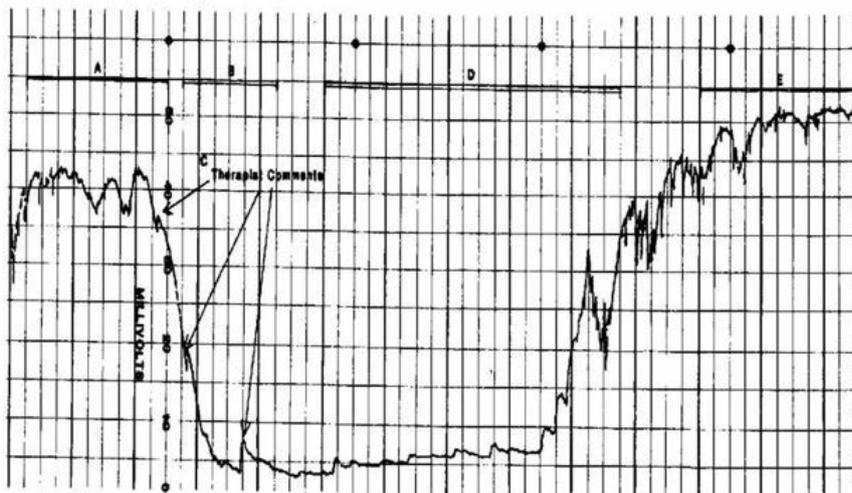


Figure 6.
The Electronic monitoring of D.C. body potential during catalepsy – millivolts on vertical access, time scale of 0.5 inch per minute on horizontal access: (A) normally awake; (B) drop in D.C. potential during hypnotic induction; (C) momentary responses to therapist remarks; (D) characteristically low activity during catalepsy; (E) typical awakening pattern at higher level than (A).

Electronic Monitoring of Catalepsy: A Two-Factor Theory of Hypnotic Experience

While the pendulum of current scientific thought has swung to the opinion that no objective measures of hypnotic trance exists, there is a long scientific tradition of measuring catalepsy. Early as 1898 Sidis published remarkably clear and convincing sphygmograph-oscillometer records distinguishing normal awakesness from catalepsy [an apparent state of quiescence of mind and body] experience during hypnosis. More recently Ravitz (1962, 1973) published tracings of the bodies D.C. [Direct Current] electrical activity measured on high-impedance recorders [impedance is the effective resistance of an electric circuit that makes such recordings possible] that underwent characteristic changes during the induction of catalepsy. Ernest Rossi has utilized a high-impedance recorder (input impedances ranging from 10 to 1000 mega-ohms with non-polarizing electrodes placed on the forehead and the palm of one hand) for a number of years since the early 1980s (Erickson & Rossi, 1981/2014; Rossi, Erickson-Klein & Rossi, 2014). The upshot of his clinical practice is that it can be used as a convenient and convincing indicator (for both the patient and the therapist) of an objective electrodynamic alteration that takes place during therapeutic trance. Whether this electrodynamic alteration is a manifestation of *quantum field dynamics* as Ravitz (2002) believed, however, can only be established by further research.

The record of a highly intelligent, normal, 24-year-old female subject during her first hypnotic induction is presented here. The erratic, fast activity at the beginning of the record (A) is characteristic of normal waking awareness. Every impulse to activity seems related to an upswing in this recording, which then drops out as soon as the impulse apparently is carried through. During

simple relaxation, meditation, and hypnosis the record smooths out and usually drops dramatically as the subject apparently gives up any active effort to direct mind or body (B). A few slow up swings are noted during the beginning of the hypnotic induction, as the subject makes an effort to attend to the therapists three reassuring comments (C). These drop out as trance deepens, and the record shows a characteristically flat, low plateau with only low-amplitude slow waves (D). With more trance experience even this low-amplitude activity drops out, and a rather smooth line record is obtained. As long as the subject remains mentally quiescent with an immobile (cataleptic) body, there are no peaks or valleys in the record. When the subject initiates mental activity or moves physically, peaks and valleys are usually recorded. The awakening period is indicated by the typical pattern of a few successively higher peaks for a few minutes each (D). The waking-fast activity at the end of this recording at (E) usually appears at a higher level than the initial basal waking level. This higher level is maintained for a few minutes until the record comes back to the default normal level at the beginning (A). The higher amplitude at the end suggests the fascinating hypothesis that at least a part of the value of therapeutic hypnosis is due to the rest during the low phase. This hypothesis remains to be investigated by future research. (Please note the minor confusion in the labels on this archival recording: The first 2/3s under the label (D) should be corrected to indicate only the low, almost flat-line deepest part of the hypnotic state. The label (C) refers only to the therapist's momentary comments.)

The difficulty with accepting such records as valid measures of trance is that they also seem to appear whenever the subject quiets down during relaxation, meditation, or sleep, whether or not hypnosis has been formally induced. We

would therefore offer a two-factor theory of the therapeutic hypnotic experience. First, there must be a state of openness and receptivity wherein subjects are not making any self-directed efforts to interfere with their own autonomous mental activity or the suggestions of the therapist. Ravitz's measurements, like those illustrated here, are probably an effective indication [measurement] of this state of quiet [electrodynamic] receptivity.

The second factor might be called "associative involvement." This process whereby the hypnotherapist engages and utilizes the subject's associations, mental mechanisms and skills to facilitate a hypnotic experience. We regard this process of utilizing a patient's own mental associations as the essence of "suggestion." *Hypnotic suggestion is not a process of insinuating or placing something into the subject's mind.* Hypnotic suggestion is a process of helping subjects utilize their own mental associations and capacities in ways that were formally outside the subject's own ego controls. Students and laboratory workers who have access to the proper electronic equipment (the Heath-Schlumberger Model SR-255B Strip Chart Recorder is suitable) can explore a number of interesting relations between hypnotic experience and the electronic monitoring of the body's D.C. potential. Is the depth of the curve (Area D) related to "trance depth"? It will be found at some subjects are able to speak during this low portion of the curve without any raise in their D.C. potential. Are these people better hypnotic subjects? Does any hypnotic phenomenon other than catalepsy have a characteristic curve? Are the classical hypnotic phenomenon more readily evoked during the low plateau (D) of the curve? (Erickson and Rossi, 1981/2014 pp 63-64; Rossi, Erickson-Klein & Rossi, 2014).

At the present time (January, 2016) we can find no published records providing answers to these basic questions. *Research by students and therapists is now very much required.* We now call this a therapeutic process of facilitating a person's natural *observer/operator* that usually functions automatically during optimal human performance. *From a quantum perspective anything that can be observed adequately can automatically operate well.* The implications of such research for investigating the possible relationships between therapeutic hypnosis, brain plasticity, behavior and the quantum qualia of consciousness, cognition and the 4-stage creative cycle.

Are the STEM inspired quantum electrodynamic fields illustrated in Ravitz's (2002) research meaningful in terms of the seemingly eternal philosophical debates about the nature and utility of consciousness, cognition, dream, emotions, fantasy, subjective belief and free will? Are these QFT observer/operator recordings of the novel quantum qualia of human cognition actually correlates of activity-dependent gene expression and brain plasticity in creating new consciousness and self-identity that is apparently lost in Alzheimer's disease, for example (Rossi & Rossi, 2014, 2015a, b; Saey, 2015)? Indeed, does the intense focusing on the quantum qualia of human experiencing really facilitate the causal efficacy of the top-down holistic approaches to healing and rehabilitation optimized by the art, beauty and truth of the many cultural rituals of naturalistic therapeutic hypnosis throughout human history?

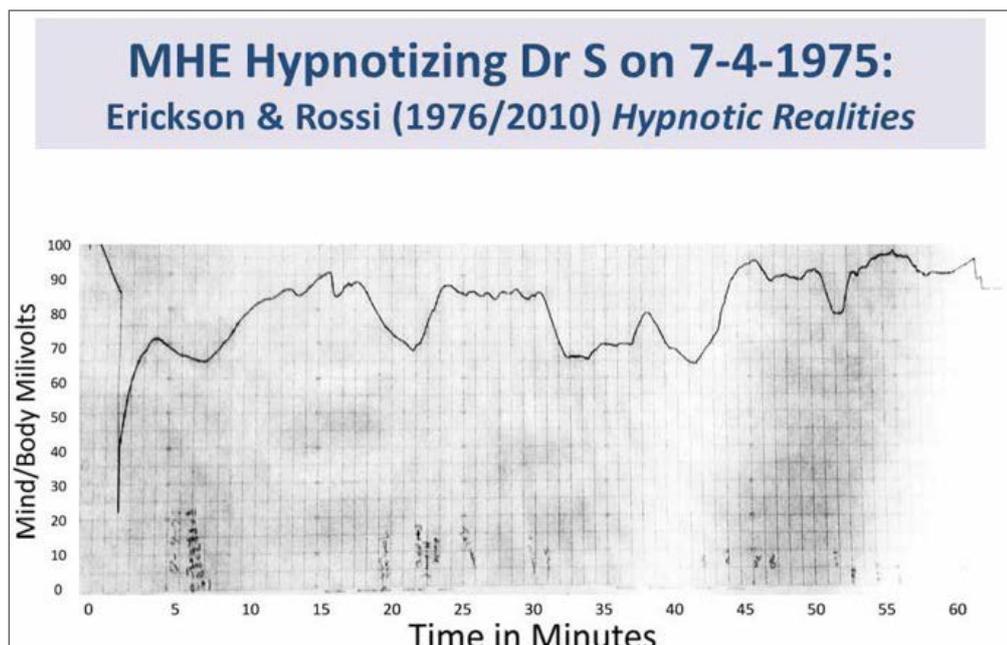


Figure 7. This recording of Milton H. Erickson M.D. hypnotizing the subject Dr. S (Erickson, Rossi & Rossi, 1976) is the only existing image of MHE's electrodynamic amplitude while at work.

Astonishingly MHE's amplitude measured in millivolts reached the top of the scale at about 98 millivolts on the Heath-Schlumberger Model SR-255B (a millivolt is 1/1000th of a volt) of while hypnotizing Dr. S.) This was the highest ever recorded by Rossi in over 40 years! We do not yet have any normative data about people at work in different age ranges, however. The electrometric recordings within 20 to about 40 millivolts are typical (Ravitz, 2002).

To answer basic questions about the basic psychophysiological nature of Erickson's naturalistic therapeutic hypnosis, Ernest Rossi then teamed up with David Lloyd, a senior researcher and professor at The Microbiology Group, School of Pure and Applied Biology at the University of Wales. Together they began a 16-year odyssey editing two volumes of international research on the fundamental principles of chronobiology and psychobiology (Lloyd & Rossi, 1992, 2008). David Lloyd's motivation was to highlight his lifetime of experimental research documenting how circadian (every 24 hours) and ultradian rhythms (less than 24 hours) from molecules to mind were the natural biological clocks regulating all life processes. Rossi's motivation was to document how the natural human 90-120 Minute Basic Rest-Activity Cycle (BRAC) could be the psychophysiological basis of Erickson's naturalistic therapeutic hypnosis (Hope & Sugarman, 2015; Lloyd & Rossi, 1992, 2008; Rossi, 2002, 2012; Rossi & Rossi, 2013). Little noted at that time, however, was Stupfel's prescient concept of the quantum nature of the metabolic and behavioral ultradian rhythms in medical research (in Lloyd & Rossi, 1992) as follows.

Regarding the oscillatory activity episodes, Aschoff and Gerkema (1985) pointed out that ultradian rhythms of long periods may be an economic strategy to avoid continuous expense of energy, and to alternate energetic expenditure and restoration. *This biological energetic discontinuity has much in common with the physical quantum theory. In 1900, Planck formulated the principle that energy is not continuously radiated, but is discontinuously emitted by quanta of energy $h\nu$ (h being the Planck constant and ν the radiation frequency).* Biologically speaking this would correspond to the intermittent, more or less periodic, exchanges of energy, heat, food intake, and rest-activity alternations between endotherms [warm blooded creatures such as humans] and their environment. (p.226, Italics added).

Stupfel's intuition was an early intimation of the quantum aspect of the oscillatory nature of the circadian and ultradian dynamics of life cycles. This quantum intuition now motivates our current proposal of how "This biological energetic discontinuity" may underpin dissociation as a fundamental characteristic of hypnotic experience. Researchers formulate the harmonic oscillator as a mathematical concept that bridges between the classical dynamics of nature originally formulated by Isaac Newton and the quantum dynamics originated by Max Planck. Figure 8 illustrates how such oscillations in the "energetic discontinuity" could be conceptualized as quantum field recordings of the

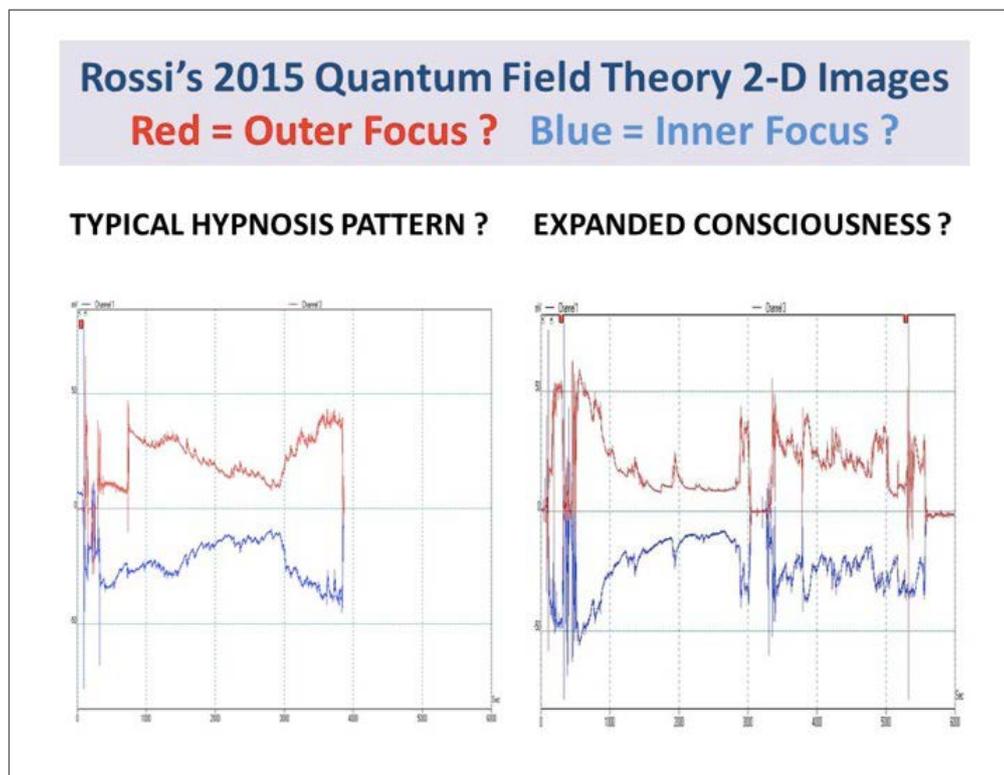


Figure 8. Typical Quantum Field Recordings in Two Dimensions of Therapeutic Hypnosis and States of Consciousness and Cognition with the Electronic Pico Data Logger.

phenomenology of consciousness and therapeutic hypnosis.

Because the Heath-Schlumberger Model SR-255B is no longer commercially available we currently utilize a Pico Technology 2000 ADC-24 High Resolution Data Logger. Among the many advantages of using this more modern technology is the greater detail of its data because of (1) its higher rate of sampling the data and (2) more channels for data acquisition.

The original 4-stage pattern of the "electrometric correlates of the hypnotic state" via Erickson's "catalepsy" illustrated and discussed earlier (Ravitz, 1950; Erickson & Rossi, 1981/2014; Rossi, Erickson-Klein & Rossi, 2014, Volume 12, *Experiencing Hypnosis*) is again evident in the top half of both of these recordings. This provides us with some assurance that modern Pico electronic technology is replicating the early work of Erickson, Ravitz and Rossi in the 1970s accurately. Whereas the early recordings from 1950 and 1981 had only one line to measure electromagnetic current in millivolts (mV) between sensors placed on the forehead and palm of one hand, current Pico technology permits measurements from two or more sensors usually placed on the forehead and the palms of the right and left hand. The lower half of these electrometric recording of hypnosis appears to be mirror neuron reflections of the top half. What could this left-right hand mirror symmetry mean?

Mirror reflections of left-right symmetry are referred to as *polarity* in classical Newtonian dynamics. By contrast the terms *parity* and/or *chirality* are used in quantum electrodynamic field theory from particle physics to biology and psychology (Baggott, 2011; Davies & Brown, 1988; Gleick, 1992; Lancaster & Blundell, 2014). The recorded field (area, channel or space) between the head, left and right hands is conceptualized in this paper as a *computational image* (Tricoche, MacLeod & Johnson, 2008) of the boundaries of the *Quantum Field Theory (QFT)*, which in more familiar terms, could be described as "the span of attention, the focus of concentration, the bandwidth of consciousness or the mind-body information channel capacity." Further research is now required to ascertain whether such computer recordings are useful visualizations for measuring either the bits of information in Classical Dynamic Theory or qubits Quantum Field Theory. Such electronic recordings could lead to the development of quantifiable scientific signatures of DNA (Service, 2014) and naturalistic therapeutic hypnosis.

Notice that while these two recordings on different people are similar in illustrating some typical aspects of therapeutic hypnosis they also manifest some important differences that may have important implications. Notice how the recording on the left hand side (tentatively labeled "TYPICAL HYPNOSIS PATTERN?") illustrates the typical downward slope of hypnotic induction. The

recording on the right hand side (tentatively labeled "EXPANDED CONSCIOUSNESS?") also manifests the typical downward slope of hypnotic induction in the first half. However, this recording is very different in its second half when she apparently experienced some profound personal psychodynamic inner work, which was associated with a very obvious wider range of electrodynamic activity. How can we account for these differences?

Thirty minutes into the session she suddenly announces she has to use the rest room. When she returns the electronic sensors are reattached to her forehead and hands. She then spontaneously and serenely recounted the most intimate personal psychodynamic history of her early childhood abuse, adolescent identity struggles and a hero's journey for her place in the professional world. All this with absolutely no prompting from the astonished authors of this paper who were both present. Notice the widening of her electrodynamic field in the last half of her recording; is this a correlate of the widening of her consciousness, cognition and self-awareness facilitated with the induction of therapeutic hypnosis? Notice the left-right hand symmetry at the zero level of her recording during the last 10 minutes of quiet non-verbal serenity and rest of this recording when neither she nor the authors uttered a single word. Does this imply she was really finished or at least satisfied with her inner psychodynamic work for now?

At the present time we have no way of answering such question about the electrodynamic correlates of consciousness, cognition and hypnosis summarized in figure 9. We now propose to answer these questions by exploring *Life on the Edge: The Coming Age of Quantum Biology and Psychology* (McFadden & Al-Khalili, 2014).

The Coming Age of Quantum Biology and Psychology

McFadden (2000) initially proposed the scientific development of quantum biology and psychology in his highly innovative volume *Quantum Evolution: How Physics' Weirdest Theory Explains Life's Biggest Mystery* as follows.

The classical view of the dynamics inside living cells (still the view held by most biologists) was of classical particles perusing independent trajectories through intercellular spaces. This vision allowed biochemists and geneticists to wholeheartedly adopt the reductionist program of dissecting the cell into smaller and smaller pieces, with the expectation of gaining a greater and greater level of understanding. *However, now biology has reached the level of fundamental particles, we must confront the quantum cell, which has revealed itself as a dynamic mosaic of quantum and classical states. Particles can no longer be considered as independent entities*

Mind-Gene-Brain Plasticity Cycle

Lloyd & Rossi (Eds. 1992, 2008) *Ultradian Rhythms in Life...*
 Rossi (1986, 1993) *Psychobiology of Mind-Body Healing*
 Rossi (2002) *Psychobiology of Gene Expression*

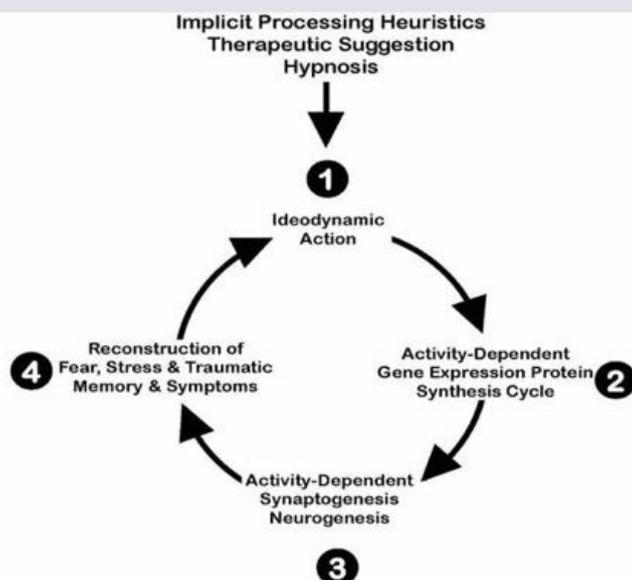


Figure 9.
 A summary of the neuroscience and the psychobiology of mind/body healing in the 1980s and 1990s before the advent of quantum biology and psychology.

but as the products of internal quantum measurement. Quantum mechanics directs us to look up from the fundamental particles and examine the environment measuring them.

Why does this matter? ... Measurement of quantum particles is not ever innocuous; it always affects dynamics. Physicists are normally employed to make quantum measurements, and the choices they make ... affect the dynamics of the systems they study. *But now, we have the living cell as an independent quantum-measuring device that measures its own state, so that the **choices** it makes about what it **wishes** to measure will influence its internal dynamics.*

... I do not believe that *E coli* cells or even individual animal cells have any volition over their actions. *The environment of the cell arms their quantum-measuring devices and thereby determines the properties that the cell can measure.* This will in turn influence the internal dynamics of the cell. This represents a kind of choice, since it is an influence denied to inanimate objects unable to measure the quantum states of the particles, within them. *But—at least in simple living systems—the ability to make these choices is not associated with any conscious decision. Nevertheless, I do believe that this ability to make quantum choices is the basis for **our** sense of volition as conscious beings.* (Pgs. 252-3, Italics added here.)

These carefully considered hypotheses about quantum dynamics as an essential characteristic of all living systems finds important scientific support in the fundamental role of the *weak force* during the DNA dynamics of transcription and translation in the psychosocial genomics of mind-gene talk in figure 10 to which we will now turn our attention.

A key concept in the transition between the classical and the quantum realm is in the so-called “Weak Force” of particle physics (Wilczek, 2015), which is indicated by the dotted lines (labeled “Hydrogen Bonds” or Proton Coding between the C...G nucleotides and the A...T nucleotides) holding the two sides of the DNA double helix together – but only weakly in figure 10.

When the weak force manages to hold the two sides of the DNA double helix together as illustrated in the colored right hand side of figure 10) the genes are in a locked position wherein they cannot divide and replicate via the Activity-Dependent Gene Expression Protein Synthesis Cycle (illustrated in the black & white image on the left hand side of figure 10).

We now hypothesize that the weak force permits (1) the classical cognitive-behavioral cycle of therapeutic suggestion to nudge the double helix of DNA open so that (2) the Activity-Dependent Gene Expression Protein Synthesis Cycle can operate to (3) optimize Activity-Dependent Synaptogenesis and Neurogenesis for (4) the Reconstruction of Fear, Stress & Traumatic Memory & Symptoms.

When the two strands of the double helix of DNA are open a DNA polymerase enzyme can slide along

the chain of nucleotides reading and replicating each genomic letter of their complementary information to turn on the activity-dependent gene expression protein synthesis cycle that generates the reconstruction and adaptive healing dynamics of epigenetics—the so-called mind-gene dialogues of psychosocial genomics.

McFadden (2000) proposed how the subjective experience of free will, characteristic of top-down human awareness associated with the “ability to make quantum choices” as “the basis for **our** sense of volition as conscious beings” as follows.

can be decomposed into orthogonal states. Quantum measurement does, however, provide us with a way to give living organisms an edge in their interaction with the outside world. Internal quantum measurement confers on living cells an ability to influence their internal particle dynamics in a way unique to life. *This influence is key to understanding how living organisms escape the straitjacket of classical determinism. The behavior of a living organism is poised*

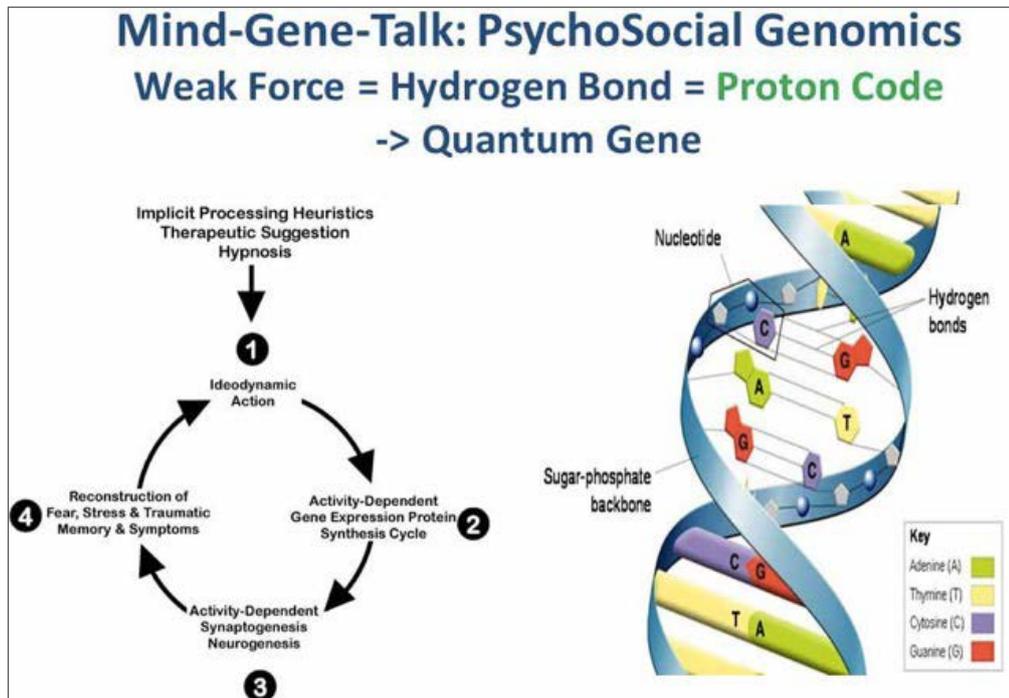


Figure 10. The transition from the classic neuroscience and of the 1980s and 1990s (on the left) to the current quantum dynamics of psychosocial genomics and the proton coding of DNA.

Bacteria, and indeed all living creatures, live at the very edge of subsistence where single quantum events can make a very real impact on their chances of survival. For most creatures ... there are many enzymes and physical states crucial to their being able to successfully perform a critical action. *These actions will be subject to quantum measurement. The densest measurements will be those that involve the greater number of interactions with the cell's environment. The cell will thereby direct itself towards those activities that interact strongly with their environment and perform directed actions.*

I should emphasize that I am suggesting an *increase in probability* for actions, not necessarily a way of making those actions happen with one hundred percent probability. How much quantum measurement can enhance the probability of quantum events inside living cells will depend on the density of the measurement steps, the robustness of quantum superposition states (to decoherence) prior to measurement, and how easily the steps

upon the quantum dynamics of this interior, allowing quantum measurement to provide the critical nudge that tips the organism one way or another to make choices and perform directed actions. (p. 254-5, *Italics added here.*)

But what, specifically, is McFadden's “key to understanding how living organisms escape the straitjacket of classical determinism?” McFadden & Al-Khalili (2014) have elaborated the role of the weak force, enzymes, proton coding and quantum tunneling in the coming age of quantum biology, which are illustrated in the figure 11.

McFadden & Al-Khalili (2014) describe enzymes as the quantum version of the so-called *vital forces of life* in this way.

Enzymes have made and unmade every single biomolecule inside every living that lives or has ever lived. *Enzymes are as close as anything to the vital factors of life.* So the discovery that some, and possibly all, enzymes work by promoting the dematerialization of particles from one point in space and their instantaneous materialization in another provides us with

a novel insight into the mystery of life. And while there remain many unresolved issues related to enzymes that need to be better understood, such as the role of protein motions, there is no doubt that quantum tunneling plays a role in the way they work...

Quantum tunneling is not magic; it has been taking place in the universe since its birth. It is certainly not a trick that was somehow "invented by life." Yet we would argue that its appearance in enzyme activity is far from inevitable, given those hot, wet and busy conditions inside living cells ... It is this kind of random motion that scatters and disrupts the delicate quantum coherence and makes our everyday world appear "normal" to us ...

After all, it was only a decade, or so, that most scientists dismissed the idea that tunneling and other delicate quantum phenomena could be taking place in biology. The fact that they have been found in these habitats suggests that life takes special measures to capture advantages provided by the quantum world *to make its cells work* ... How does life keep that enemy of quantum behavior, decoherence, at

exciton with which we began this paper in figure 1 with Einstein.

Let's imagine that a leaf has just picked up a solar photon and converted its energy to an *exciton*. Considered classically, the exciton is a particle that is localized in space and time. *But as the double-slit experiment revealed, quantum particles also possess a diffuse wave character that enables them to exist in multiple places simultaneously as a quantum superposition. It is the exciton's waviness that is essential for efficient quantum transport, for this enables it, like a water wave, to explore multiple paths simultaneously. But if its quantum waviness breaks on the molecularly noisy rocks of decoherence inside the leaf, then its waviness will be lost and it will become a localized particle stuck in a single position.* The noise essentially acts as a kind of continuous measurement, and if it is very intense then decoherence will take place very quickly, before quantum coherence has a chance to help the exciton wave reach its destination. This is the quantum Zeno effect: constantly collapsing the quantum wave into the classical world.

Life on the Edge: The Coming Age of Quantum Biology. McFadden & Al-khalili (2014).

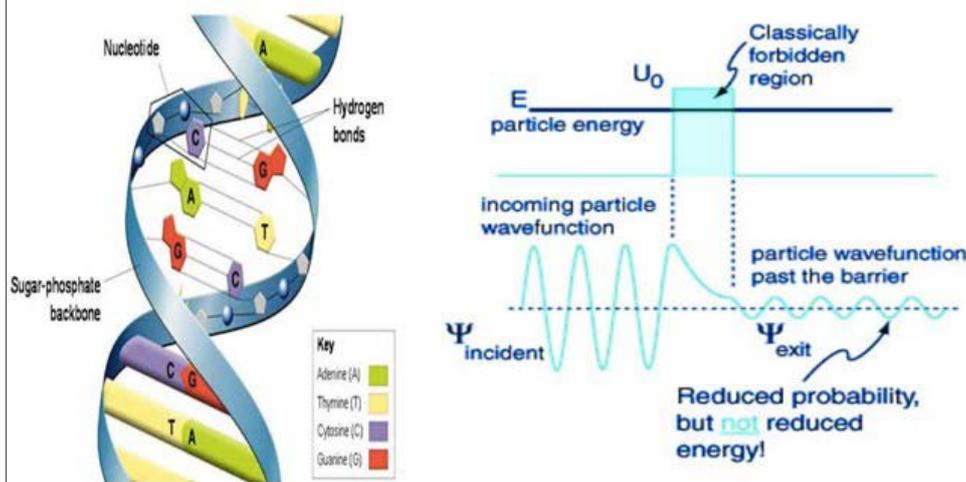


Figure 11. The classical/quantum interface that makes life possible is mediated by enzymes operating as the so-called vital forces of life with quantum tunneling.

bay? This is one of the biggest mysteries of quantum biology ... (p. 97-98, Italics added here)

It is precisely at this point that McFadden & Al-Khalili (2014) make an important point that is illustrated in the right hand side of figure 11 in our blue image of the classical/quantum interface that makes life on the edge possible. Their pithy argument utilizes the *quantum dynamics of the*

When the MIT team estimated the influence of molecular noise/vibrations in the bacterial photosynthetic complex, they discovered that quantum was optimal at temperatures around those at which microbes and plants perform photosynthesis. *This perfect match between optimal transport efficiency and the kind of temperatures in which living organisms*

live is remarkable and, the team claims, suggests that three billion years of natural selection have fine-tuned the quantum-level evolutionary engineering exciton transport to optimize the most important biochemical reaction in the biosphere. As they argue in a later paper, "natural selection tends to drive quantum systems to the degree of quantum coherence that is 'just right for attaining maximum efficiency." (p. 296-297, italics added here). This enables us to update

Halpern, 2015; Whitaker, 1996). Aspects of this unification are illustrated in our Mind-Gen-Quantum Cascade diagrammed in figure 13.

Seth Lloyd, currently professor of quantum-mechanical engineering at MIT, is working with a variety of research groups to construct and operate quantum communication systems consistent with the Mind-Gen-Quantum Cascade illustrated in figure 13. He recently outlined the following description of his work (Lloyd, 2014) for the general public, Quantum Biology: Better Living Through

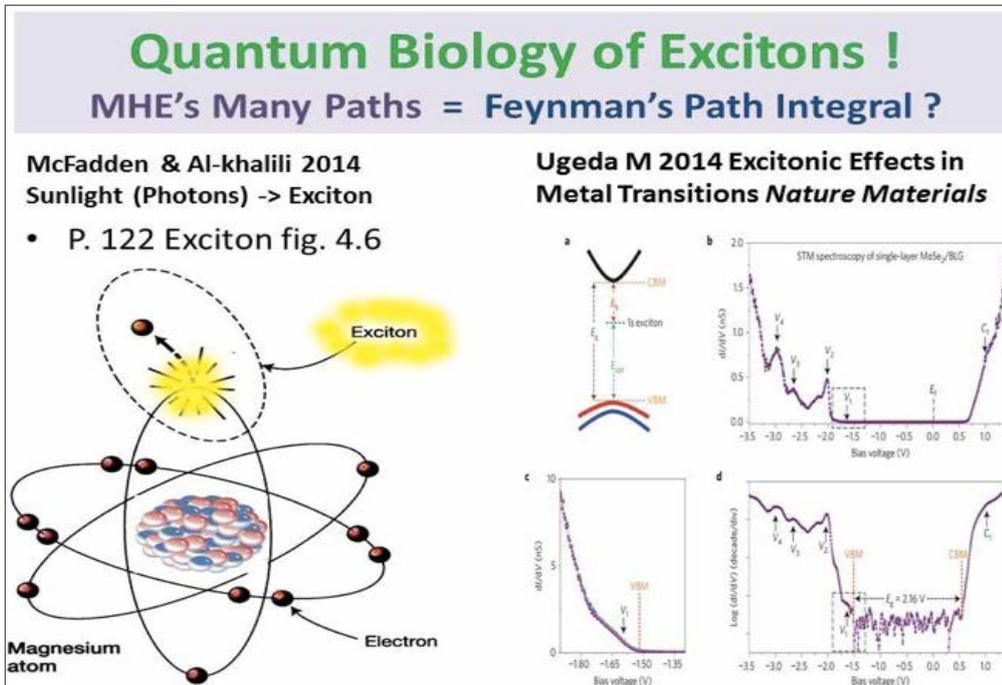


Figure 12. The Quantum Biology of Excitons in Living Systems (on the left hand side) are mathematically matched by graphs of the Quantum Dynamics of Excitonic Effects in modern communication devices (on the right hand side).

the quantum biology of Excitons and summarize their vast range of applications in natural living systems as well as non-living systems that make up modern computers and communication devices in Figure 12 (Ugeda et al. 2014).

Notice the similarity between the Quantum Dynamics of Excitonic Effects in modern communication devices on the right-hand side of figure 12 with the Ravitz (1950, 2002) 4-stage images of the electrometric correlates of Erickson's naturalistic hypnosis (catalepsy) and Rossi's images of a two-factor theory of therapeutic hypnosis reviewed earlier in this paper. This similarity prompts us to hypothesize how Milton H. Erickson's Many Paths Suggestions for resolving human problems has an unexpected quantum resemblance to Feynman's (1985) Path Integral approach to a Strange Theory of Light and Matter. These surprising similarities that illustrate how the fundamental dynamics of quantum field theory applies to both living and non-living systems contributes to a unified theory of the four fundamental forces of nature long sought by Einstein, Bohr, Schrödinger and many others in this century (Baggott, 2011;

Quantum Mechanics, PBS, March 10, KQED.

In all green plants containing chlorophyll, for example, an incoming particle of light (photons streaming from the sun to earth) can slam into an electron, bumping it to a higher energy level and leaving a hole at the energy level where the particle had been. As illustrated here *the exciton is the excited electron paired with the resulting hole that can move energy by physically hopping from one molecule of chlorophyll (with and atom of magnesium in its reaction center) transferring energy like an antenna transmitting a signal. The transmission is almost instantaneous, with the longest-lasting exciton existing for just a few milliseconds.*

By constructing detailed quantum mechanical models, my collaborators and I were able to identify the optimal strategy for the interplay between wavelike propagation and classical hopping in photosynthesis. Over short distances, the wavelike propagation is more effective than random hopping. The exciton travels like a wave right up to the distance at which destructive interference causes it to get stuck. *At this point, the fact that living systems are hot, wet environments comes into play: The environment effectively gives the exciton a whack*

Rossi's Mind-Gene-Quantum Cascade Transcription/Translation = Therapeutic Hypnosis ?

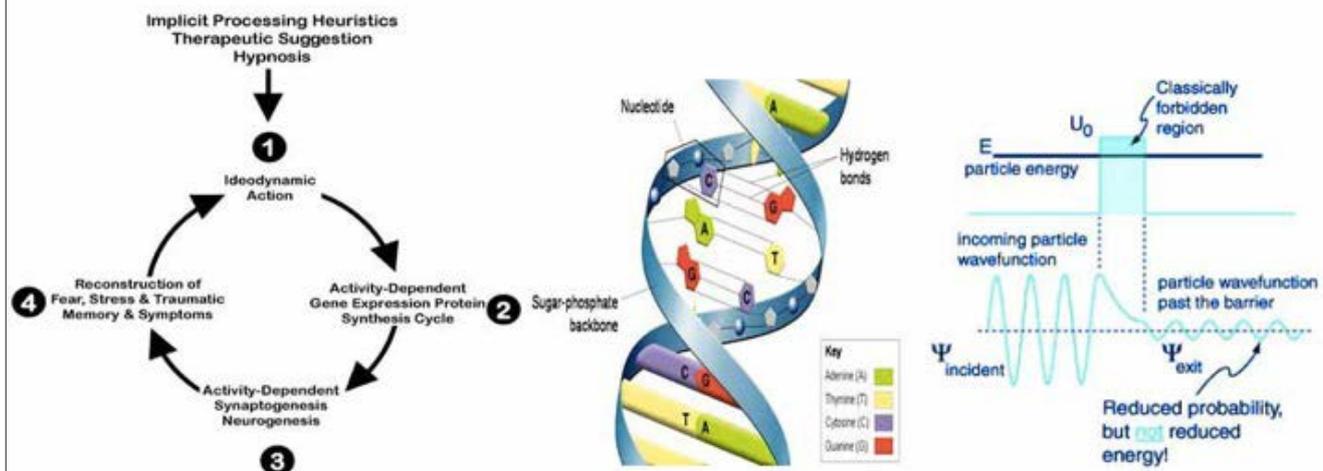


Figure 13. *The Mind-Gene-Quantum Cascade Bridged by the Weak Force and Quantum Tunneling in a Unified Quantum Field Theory of Physics, Biology and Psychology.*

that gets it unstuck and makes it perform a classical hop, which frees up the exciton to propagate again. (The technical term for this whack is “decoherence.”) Then the process repeats. The wave propagates until it gets stuck; the environment gives it a whack; the exciton hops. Eventually, the exciton reaches the reaction center [within a molecule of chlorophyll] in the minimum possible time. Expressed in terms of our quantum theory, the rule is simple: Wave until you get stuck, then hop ...

Where else might quantum mechanics play a role in life? Because light is made up of photons, interactions between living systems and light represent a good place to look. *Our eyes are capable of detecting single photons by a highly quantum mechanical mechanism: A molecule in the retina absorbs a single photon, and uses its energy to release the flow of tens of thousands of ions, stimulating a neural response. Neural impulses in the brain are probably too coarse and classical to support the wave-like quantum dynamics that hold sway in photosynthesis, but at the level of individual synapses, the neurotransmitter binding mechanism might well benefit from the same types of quantum dynamics ...*

As scientists delve deeper into the details of molecular dynamics in living systems, they are likely to see more examples of quantum mechanics at work. We don't yet know exactly what aspects of biology benefit from quantum mechanics. But we do know one thing: The un-quantized life is not worth living. (Seth Lloyd, 2014, Italics added here.)

We certainly agree with Seth Lloyd's quantum perspectives, which we now use to update some classical aspects of human biology and psychology that were previously published as *The 90-120*

Minute Basic Rest-Activity Cycle (David Lloyd & Ernest Rossi, 1992, 2008) and *The 20 Minute Break* (Rossi & Nimmons, 1991; Rossi & Rossi, 2016, in press) that are the fundamental psychobiological dynamics of Erickson's naturalistic therapeutic hypnosis (Rossi, Erickson-Klein & Rossi, 2008-2015). The question now is: What is the quantum engine that drives the natural psychosocial genomic cycles of life, consciousness and cognition (Rossi & Rossi, 2014 a, b; 2015 a, b).

Taken together figures 13, 14 and 15 provide an overview of our concept of a quantum RNA/ DNA psychobiological engine that underpins the classical molecular biology of living systems. Note how our juxtaposition in figure 15 of an image of the dynamics of gene expression during the 90-120 Minute Basic Rest-Activity Cycle (BRAC) and the 20 Minute Break on the left-hand side (Bar-Joseph et al., 2012) is similar to a typical image of the wave nature of quantum systems on the right-hand side (Haldal et al., 2015). Notice how within the first 20 minutes of the BRAC there is a powerful burst of gene expression. *We hypothesize that this burst of gene activity for about 20 minutes at the beginning of the 90-120 minute BRAC generates the proteins, hormones and cellular energy sources such as ATP is underpinned by The Quantum Heat Engine, which powers the remainder of that BRAC illustrated by its long tail of about 120 minutes* (Bar-Joseph et al., 2012).

Singh (2012) has published a review of quantum effects in biology with a highly sophisticated mathematical analysis and visualization of exciton motion in photosynthetic systems.

The present review is devoted to our recent studies on the excitonic motion in

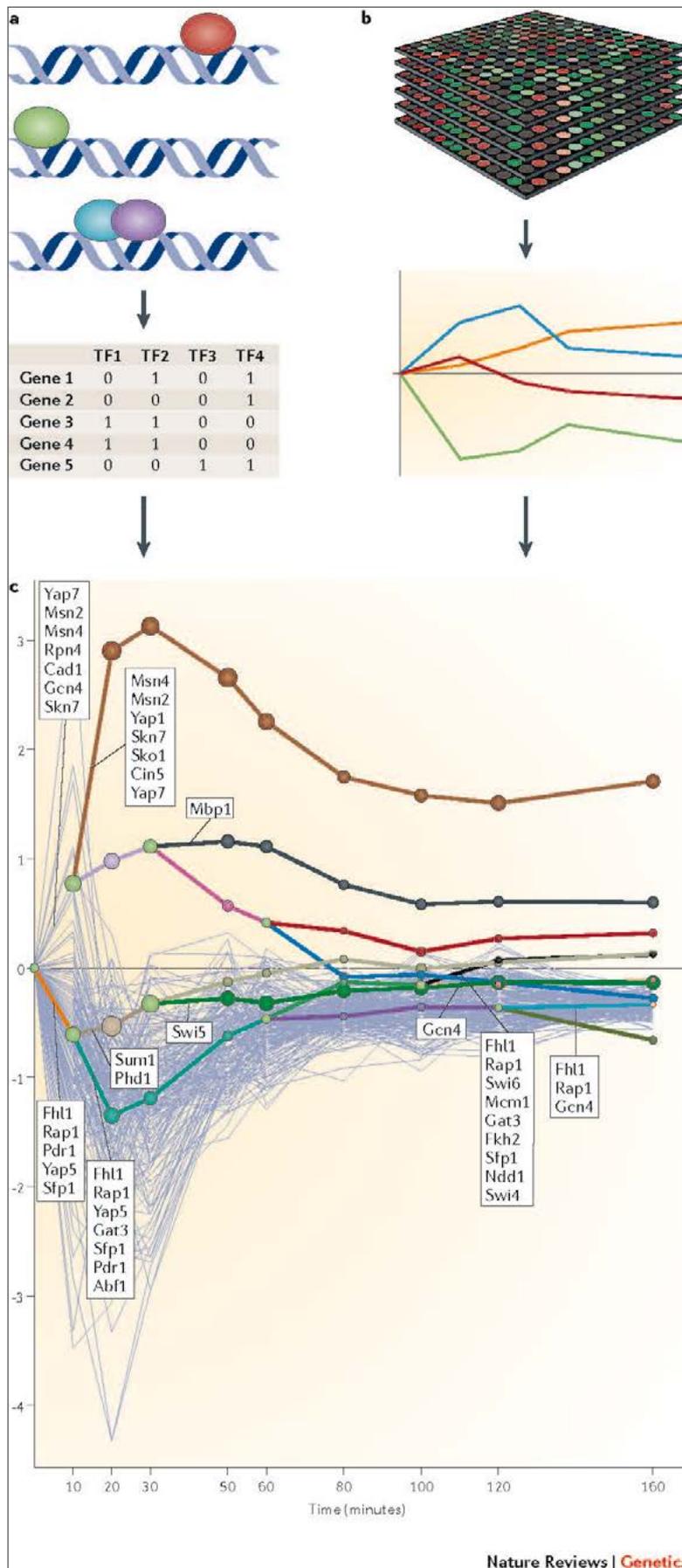
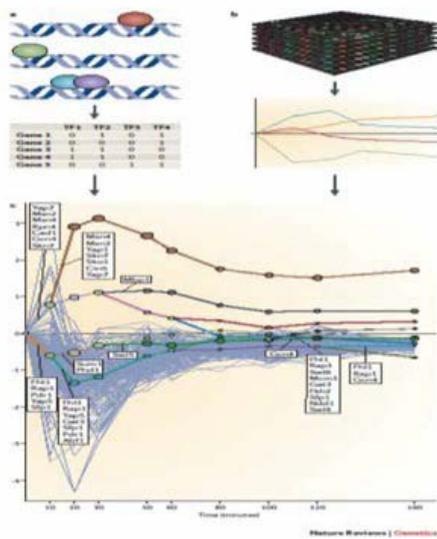


Figure 14. Classical RNA/DNA time series research data on gene expression (Bar-Joseph et al., 2012) is a source for our proposed quantum heat engine of biology and psychosocial genomics.

Quanta ~20 - 90 Min BRAC Engine -> Gene Expression & Brain Plasticity

20 Minute Gene Expression



Quantum Biology Engine

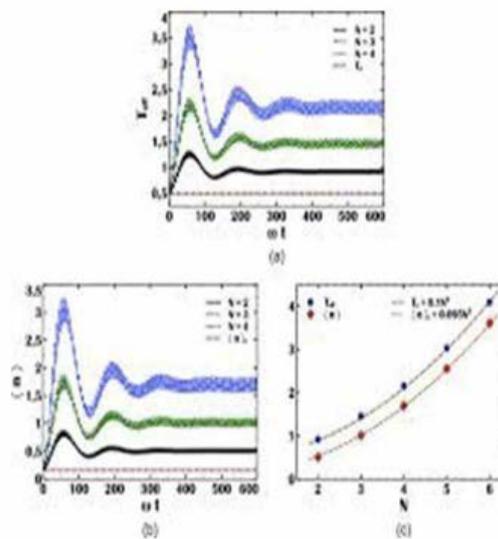


Figure 15. The proposed RNA/DNA psychobiological engine of the 90-120 Minute Basic Rest-Activity Cycle and the 20 Minute Break on the left hand side image is juxtaposed with a mathematical visualization of The Quantum Heat Engine on the right hand side images (Hardal et al., 2015). See also: (Dorfman et al., 2013; Hayes et al. 2013; Singh, 2012; Voronine & Scully, 2014; Uzdin et al 2015) for more experimental data and math expositions supporting the concept of The Quantum Heat Engine.

photosynthetic systems. In photosynthesis, the light photon is absorbed to create an exciton in the antenna complex of the photosynthetic pigments. This exciton then migrates along the chain-biomolecules, like the FMO complex, to the reaction center where it initiates the chemical reactions leading to biomass generation. *Recently, it has been experimentally observed that the exciton motion is highly quantum mechanical in nature i.e., it involve long time (600 femto sec or $\sim 10^{-15}$ seconds) quantum coherence effects.* (p. 1) ... recent studies with sophisticated 2D photon echo spectroscopy show long livid coherence effects in exciton motion which contradicts the long held old idea of incoherent motion [in living systems]. (p. 23, italics added here).

Hardal & Müstecaplıoğlu (2015) describe the dynamics of a “Superradiant Quantum Heat Engine” that extends Carnot’s classical mechanism of the thermodynamics of engines.

Quantum physics revolutionized classical disciplines of mechanics, statistical physics, and electrodynamics. One branch of scientific knowledge however seems untouched: thermodynamics. Major motivation behind thermodynamics is to develop efficient heat engines. Technology has a trend to miniaturize engines, reaching to quantum regimes. Development of quantum heat engines (QHEs) requires emerging field of quantum thermodynamics. Studies of QHEs debate whether quantum coherence can be used

as a resource. We explore an alternative where it can function as an effective catalyst. We propose a QHE which consists of a photon gas inside an optical cavity as the working fluid and quantum coherent atomic clusters as the fuel. Utilizing the superradiance, where a cluster can radiate quadratically faster than a single atom, we show that the work output becomes proportional to the square of the number of the atoms. In addition to practical value of cranking up QHE, our result is a fundamental difference of a quantum fuel from its classical counterpart.

It is now an open question as to whether such a “Superradiant Quantum Heat Engine” could underpin the classical molecular biology of living dynamics such as RNA/DNA and photosynthesis. McFadden & Al-Khalili (2014), for example, engagingly describe how the FMO complex, a green photosynthetic protein, was discovered to have a *quantum beat* that takes a quantum walk characteristic of living systems.

The lead author on the paper, spent the entire night stitching together the data ... to produce a plot of their data ... a rising and falling signal that oscillated for at least six hundred femtoseconds ... (p. 125)

The beats ... discovered in the FMO complex were indeed a signature of quantum coherence, and Lloyd concluded that the chlorophyll molecules were operating a novel search strategy know as a quantum walk ... (p. 127)

The discovery of quantum coherence in warm, wet, turbulent systems such as plants and microbes has come as a huge shock

to quantum physicists ... Still the quantum world appears very strange to us and it is often claimed that this strangeness is a symptom of a fundamental split between the world we see around us and the quantum underpinnings. *But in reality there is only a single set of laws that govern the way the world behaves: quantum laws. The familiar statistical laws and Newtonian laws are, ultimately, quantum laws that have been filtered through a decoherence lens that screens out the weird stuff (which is why quantum phenomena appear weird to us). Dig deeper and you will always find quantum mechanics lurking at the heart of our familiar reality.*

What's more, certain macroscopic objects are sensitive to quantum phenomena: and most of these are living ... quantum tunneling inside enzymes can

be an amplification from the quantum (unconscious) to the classical (conscious) realm (Meier, 2001). The very careful splicing together of so many different levels of spacetime realities in this paper may still seem a bit tenuous to the uninitiated. The next image on DNA Replication and Repair is therefore included to further validate the quantum underpinning of what we usually call "reality" in physics, biology and psychology.

Moolman et al. (2014) documented the basic molecular dynamics of DNA replication, repair and gene expression that underpins the classical/quantum interface that we experience as life, consciousness and cognition. They divided the complete DNA Basic Rest-Activity Cycle into three time regions. First notice how the (a) top image with a computer simulation of five variables (colors) coming together in a black quantum-like wave of about 80 to 100 minutes representing the

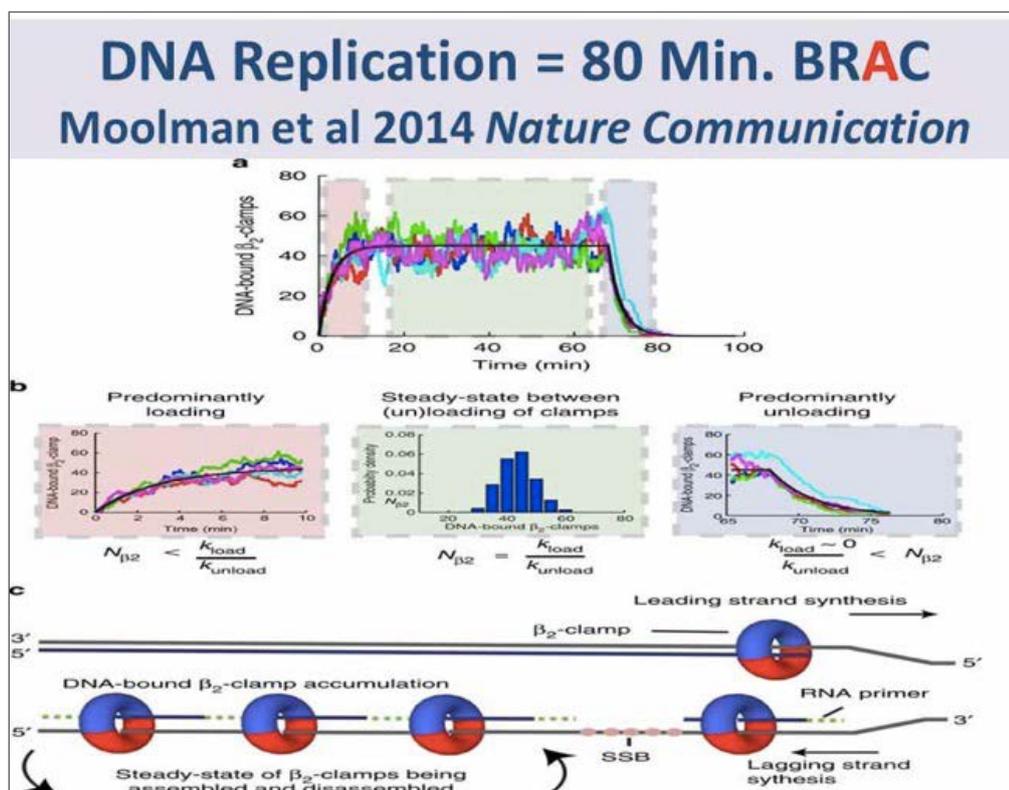


Figure 16. A Computer Simulation of the BRAC Cycle of DNA Replication and Repair (Adapted from Moolman et. al. 2014).

make a difference to whole cells ... most of the biomass on the planet appears to be dependent on a delicate quantum coherence ... *we see Schrödinger's order from order capable of capturing quantum events, and what Jordan termed amplification of quantum phenomena to the macroscopic world. Life seems to bridge the quantum and classical worlds, perched on the quantum edge.* (p. 131-132, most italics added here.)

It is interesting to note in this regard how the Swiss pioneering psychoanalyst Carl Jung also used the term "amplification" to describe the process of raising contents of the unconscious to consciousness – which we would now recognize to

DNA Basic Rest-Activity Cycle. Below it in the (b) smaller pink graph they illustrate an initial stage of DNA replication of about 20 minutes. Next to it in the light green graph the probability dynamics of adaptive DNA replication is quantified in the dark blue histogram. The light gray graph on the right shows the termination stage DNA replication of about 10 minutes. Details of the BRAC of DNA replication are illustrated in (c) the lower series of blue and red donuts showing leading and lagging strands of DNA synthesis, etc.

We propose that this simulation of DNA replication and repair underpins what we have described the classical/quantum dynamics of the 4-Stage Creative Cycle (Initiation, Incubation, Aha!

and Integration) in Milton H. Erickson's naturalistic therapeutic hypnosis (Rossi, Erickson-Klein & Rossi, 2008-2015). We now take a leap into what the pioneering physicist Nick Herbert (1987) has called "*Quantum Reality: Beyond the New Physics, An Excursion into Metaphysics and the Meaning of Reality.*"

A Quantum Field Theory of Life and Consciousness: The Quantum Dynamics of the Basic Rest-Activity Cycle and the 20 Minute Break

Here there may be Dragons! Our world is full of surprises! We have now come to the edge of our human understanding of life and consciousness. We presume to now pick up where Nick Herbert (1987) ended his pioneering survey of *Quantum Reality* with these prescient words.

Is Consciousness a Type of Quantum Knowledge?

Although it seems to be true that every physics experiment is classical in form if not in content, is it so obvious that the full range of human experience is also absolutely classical?

Science's biggest mystery is the nature of consciousness. It is not that we possess bad or imperfect theories of human awareness; we simply have no such theories at all ...

Is it possible that consciousness is some sort of quantum effect? Is human awareness a privileged access to the "inside" of the quantum world an open door to some brain quon's [quantum] realm of possibility? Can we know firsthand what it is like to dwell in the quantum world just by sitting still and looking inside our heads?

Human mental experience seems to be of two kinds—an experience of facts, memories, emotions, body states - a thoroughly classical kind of knowing which we might call "computer consciousness," which takes place against a peculiar background of "raw awareness"—that uncanny yet familiar feeling we relinquish when we go to sleep and awaken into every morning. Some have called this second kind of experience "consciousness without an object." I call it "ordinary awareness" and believe that it is one human quality that distinguishes us from computers –at least computers as they are presently constituted.

If ordinary awareness is a direct connection to quantum reality, then just as our external knowledge of quantum entities may be characterized by the term "quantum ignorance," so we might call this immediate internal experience of the world's real nature "quantum knowledge." One of the greatest

scientific achievements imaginable would be the discovery of an explicit relationship between the waveform alphabets of quantum theory and certain human stages of consciousness. (p. 248-249, italics added here)

But how, more specifically, could we now update an answer Herbert's fundamental question: "Is Consciousness a Type of Quantum Knowledge?" What would be the fundamental equations, for example, describing the quantum engine and energy source of cosmos and consciousness?

The Quantum Engine Energy Source of Cosmos and Consciousness

In a recent book the Noble Prize winning particle physicist, Frank Wilczek (2015), provides an illuminating discussion of the simple equations of particle physics that govern the Quantum Engine Energy Source of Cosmos and Consciousness.

To explain these events, the physicists had to define one more force in addition to those of gravity, electromagnetism, and the strong force.

This new addition, this fourth force, is called the weak force. The weak force completes our current picture of physics: The Core.

Life on Earth is powered by a tiny fraction of the energy released from the Sun, captured as sunlight. The Sun derives its power by burning protons into neutrons, releasing energy. (p. 260, Italics added here)

A dramatic image of how life on earth is powered by the quantum dynamics of how **Neutrons (Blue for Nature)** are converted to **Protons (Green for Life)** plus **Electrons (Red for Energy)** plus **Anti-Neutrinos** is well illustrated and discussed in Wikipedia.

Wilczek (2015) discusses the dynamics of neutron to proton conversion as follows.

Because protons and neutrons are ... complex composites of more basic quarks and gluons, we should track *proton* and neutron conversions to their more basic source. The deep structure underlying those conversions is the quark process:



Because neutrons are based on *udd* [*up, down, down*] quark triads, while protons are based on *uud* [*up, up, down*] the quark transformation $d \rightarrow u$ enables a neutron to transform into a proton. That transformation is accompanied by emission of an electron *e* and an antineutrino $\bar{\nu}$. So our basic, quark-level interaction is realized:



This slow decay (lifetime fifteen minutes) is the fate of isolated neutrons. (They are stabilized only when bound inside nuclei [of atoms]. (p. 260-261, Italics & bold added here)

We now propose a highly speculative hypothesis about the source and evolution of cosmos and consciousness: **The slow decay (lifetime fifteen minutes) of the equations of neutron/proton transitions is the quantum engine underpinning of the 20 Minute Break, which humans experience as the initial phase of the 90-120 Minute Basic Rest-Activity Cycle of the RNA/DNA dynamics of life and consciousness.**

The particles we're interested in have a small intrinsic spin. They're forever twirling, like tireless ice skaters. So we can apply our logic to them, and derive a direction associated with their spin. If our particle is moving in that direction, we say that the particle is right-handed. If it is moving in the opposite direction, we say it is left-handed. The handedness of a particle, in

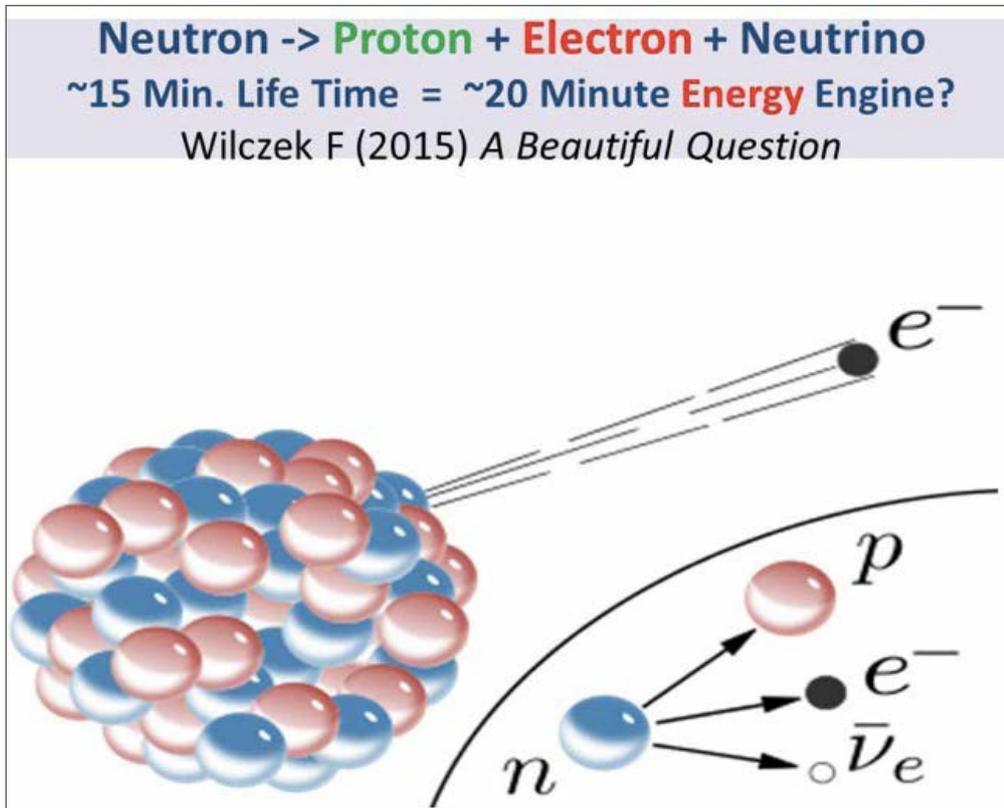


Figure 17. The Quantum Engine Energy of Cosmos and Consciousness. The "Weak force" illustrates how a neutron can decay into a proton, electron and antineutrino within a lifetime of about 15 minutes. (Illustration from Wikipedia Creative Commons.)

Some very interesting amplifications of the quantum inner quark dynamics in life, the consciousness, cognition and possibly even psychotherapy are now outlined in the next few images.

Wilczek (2015) continues with his perspectives of the quantum contributions of the weak force and quark interactions amplified to the phenomenology of life with an introduction to *Handedness & Parity Violation of Quantum Particles* as follows.

A very profound aspect of the weak force, called parity violation, was discovered theoretically by TD Lee and CN Yang in 1956. To describe it, we must introduce the concept of particle *handedness*. It applies to particles that are moving and spinning.

If an object rotates around an axis, we can assign a direction to the axis, as follows. Imagine our spinning object as an ice skater. If her rotation brings her right hand down toward her abdomen, we choose the direction from her toes to her head; if it brings her right hand toward her back, we choose the direction from head to toes.

other words, orients its spin with respect to its velocity.

What Lee and Yang proposed is that the left-handed quarks, electrons, and neutrinos ... participate in the weak interaction, as do right-handed antiquarks, antielectrons (i.e., positrons), and antineutrinos ... but that particles with the opposite handedness do not. Experiments bore out their proposal. (p. 261-262)

Could we now amplify the *Handedness & Parity Violation of Quantum Particles* characteristic of the micro-world of physics to the macro-world of everyday life as we commonly experience it? Is this another example of the appropriateness of *amplification from the invisible quantum world of particle physics to the classical world of everyday life?* Physicists and mathematicians make this transition with a combination of observation, calculation and experimentation to make valid predictions. People in the arts and humanities tend to do it through metaphor, poetry, empathy and mirror neurons. Psychotherapists at the present time tend to validate their work with so-called "mindfulness – being

consciously focused on current experiencing and future well-being.”

Many of our therapeutic demonstrations of the Erickson/Ravitz/Rossi electrometric correlates of hypnosis, meditation and the 4-Stage Creative Cycle have focused on the dynamics of handedness to make visible the invisible inner experiences of the so-called, creative unconscious (Rossi, Erickson-Klein & Rossi, 2008-2015). The next image extends the visualization of the quantum dynamics of the cosmos and consciousness with the concept of a universe from nothing that has even more profound implications for understanding the quantum dynamics of the human condition (Krauss, 2012).

In a science prize winning essay Aiden (2011) charmingly describes how, as a young lad, he watched the 1968 film *Powers of Ten*, which illustrated the size of the universe and everything

Where to look? The film provides a clue: at 10^{-6} m, we enter the cell nucleus, but see little before reaching the double helix (10^{-8} m). Something is missing. DNA must fold further; if it did not, human genomes would be 2 m long and would not fit in the cell, much less the nucleus.

Since 1968, we have learned that DNA wraps around histones, packing $\sim 10^2$ base pairs into the 10^{-8} m nucleosome. *We also know that individual chromosomes occupy distinct sub-nuclear volumes called chromosome territories which pack $\sim 10^8$ base pairs into 10^{-6} ...*

Powers of Ten is an apt metaphor for science, which progresses by probing the world at one scale after another. *Humans are naturally found at 10^0 m and,*

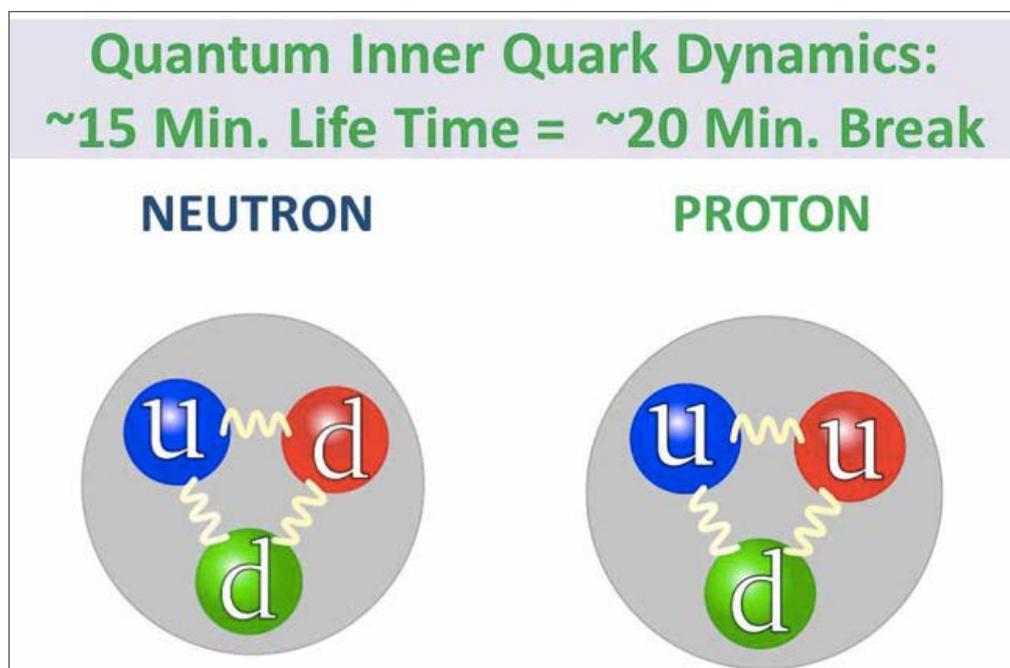


Figure 18. *The Inner Quantum Structure and Dynamics of Neutrons and Protons consisting of up (u) and down (d) Quarks (circles in color) and gluons (springs in white).*

in it in **meters (m)**. This profound perspective can help us visualize a Quantum Field Theory of life and consciousness that generates *A Universe from Nothing* (Krauss, 2012). As we shall see, this could inspire an optimistic ethos of the human condition that could replace the unfortunate current view of an impoverished humanity dominated by the territorial imperative of conflict and war (Arbery, 1996).

The camera begins with a couple on a picnic and then zooms out: to the picnic ground (10^1 meters), **Chicago (10^5 m)**, **Earth (10^7 m)**, and, eventually, the universe (10^{26} m), only to zoom back in until it reaches the interior of a proton (10^{-16} m). Breathtaking structures emerge at each scale. *I realized that if, one day, I could hold that magical camera—examining a phenomenon at a new scale, however briefly—I would see things that had not been seen before.*

after thousands of years, have managed to explore ~25 orders of magnitude in either direction: from the 1-MeV neutrino (10^{-24} m), to the observable universe (10^{26} m). We suspect that this is all there is: that in this universe of scales, humankind lies at the center. Perhaps we are right. But as our forebears—who marked the edges of their maps with phrases like “here be dragons” ... our world is full of surprises. So on we must go, building better cameras. (Aiden, 2011, p. 1222-1223. Italics and Bold added here)

To understand the implications of this quote from Aiden one must read the exponents of the *Powers of Ten* very carefully. The size of the universe we “*have managed to explore is ~25 orders of magnitude in either direction: from the 1-MeV neutrino (10^{-24} m), to the observable universe (10^{26} m)*” is vast, indeed.

Vast as it may be the universe is still expanding;

spacetime is being continually created. This leads the physicist Krauss (2012) to propose that the quantum source of the universe, life and consciousness is still being created from nothing! Here's how he expresses the quantum logic of it all in the final chapter of his book.

Nothing is Unstable

The existence of energy in empty space – the discovery that rocked our cosmological universe ... only reinforces something about the quantum world that was already well established in ... laboratory experiments ... empty space is complicated. It is a boiling

force on your hair or watch a balloon stick to a wall. However, the quantum theory of electromagnetism suggests that the static field is due to the emission, by charged particles involved in producing the field, of virtual photons that have essentially zero total energy. These virtual particles, because they have zero energy can propagate across the universe, without disappearing, and the field due to the superposition of many of them is so real it can be felt (Krauss 2012, p.153-4, italics added here).

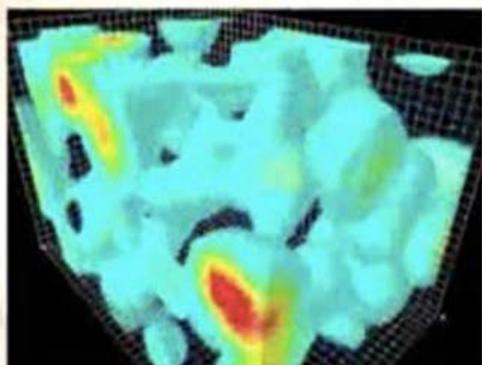
Rift with paradox as this sample of quantum logic operative on scales from cosmos to consciousness

A Universe from Nothing (Krauss 2012) Vs Territorial Imperative (Ardrey 1966)

Quarks Inside the Proton (p. 70)

Proton is Full of Virtual Particles

Empty Space not Empty!



- **Quarks themselves provide very little of the total mass . . . the fields created by these particles contribute most of the energy that goes into the proton.**
- **The same is true of the neutron, and since you are made of protons and neutrons, the same is true of you. (Page 70)**

Figure 19.
A Quantum Field Theory Simulation of neutron/proton quark interactions that apparently generate the quantum engines of the life equations in A Universe from Nothing (Krauss, 2012).

brew of virtual particles that pop in and out of existence in a time so short we cannot see them directly.

Virtual particles are manifestations of a basic property of quantum systems ... Systems continue to move, if just momentarily, because all possible states, including states that would not be allowed if the system were actually being measured. These "quantum fluctuations" imply something essential about the quantum world: nothing always produces something, if only for an instant.

But here's the rub. The conservation of energy tells us that quantum systems can misbehave for only so long ... As a result, you might presume to safely argue that this "something" that is produced by quantum fluctuations is ephemeral – not measurable, - unlike, say, you or I or the earth on which we live ... For example, *consider the electric field emanating from a charged object. It is definitely real. You can feel the static electric*

may seem (recall the Powers of Ten above), it can have profound implications for understanding some of the imponderables of the human condition. In a universe so huge and continually expanding by creating spacetime that "is a boiling brew of virtual particles that pop in and out of existence in a time so short we cannot see them directly," can none-the-less generate the quantum life equation (recall $n \rightarrow p + e + \nu$)? Such quantum logic, experimentally validated with billion-dollar particle accelerators, would seem to guarantee a generous source of energy and matter ($E = mc^2$) to satisfy even the most demanding human societies.

The Territorial Imperative (Ardrey, 1966), however, purportedly documents how humans and other species seemingly will always compete and go to war on the edge of their life space, as if there would never be enough territory to support the well-being of all. Resolving this stumbling block with the more powerful quantum engines of our ever generous universe could inspire us with the values and truth of human creativity and better self-care.

Summary

Our review of The Quantum Field Theory of Life and Consciousness began with a celebration of The Centennial of Einstein's General Theory of Relativity and the Four Fundamental Forces of Nature in 2015. This led to a re-discovery of the almost forgotten heritage of Milton H. Erickson's electrodynamic measurement of the transitions in consciousness during naturalistic therapeutic hypnosis in this century. We explored the turning point between the classical ordinary world we experience in daily life and its quantum underpinning for understanding the human condition. The advent of current research in the quantum biology of life and consciousness

is now generating an enlightened horizon for the pursuit of STEM education (Science, Technology, Engineering and Math) in all the life sciences. We introduce new technology that can reduce stress and optimize human health and well-being with new concepts of meditation, mindfulness and mind/body medicine. We reviewed profound quantum perspectives of how our expanding universe, generated by *The Quantum Heat Engine*, could inspire an optimistic ethos of the human condition in a very generous universe for free that could replace the territorial imperative of impoverishment, conflict and war.

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THE NEUROSCIENTIFIC EVOLUTION OF ERICKSONIAN APPROACH AS A METAMODEL OF HEALING

A 10 points guideline and the technique that modulates brain waves to foster a mind-body healing

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*The future is now
because the science goes
where we imagine it !*

Abstract

This paper will present the neuroscience evolution of Ericksonian approach as a consequence of the latest findings on mind-gene relationship. Starting from M.H. Erickson's intuitions on mind-body functioning, we will present some important neuroscience findings that confirm these intuitions defining Erickson's work as a meta-model of healing.

Readers will be provided with a description of a 10 points guideline, which can be used in the clinical intervention in order to lead their patients to healing. In addition an easily understandable and usable technique will be presented, so that readers will be able to use it with patients suffering from organic and/or psychopathological problems to facilitate a better mind-body integration. These indications can perfectly fit into readers' clinical practice, independently from the clinical approach they already use.

One limit of our perspective stands in the fact that it is a complex in its premise which initially could arouse some confusion, but after the practical experience that takes place in the second part of the presentation everything will appear more simple to be understood and used. Then the right in-depth analysis and the exercise will permit a growth of the therapeutic effectiveness in the participants' clinical activity.

How mind and consciousness talk with the world and our genes

This contribution starts from the consideration that in many cases the different levels of our functioning have been distant or totally separate from each other. The reasons are many, being often the result of methodological and/or epistemological limits, which have led the disciplines and/or the different approaches in those disciplines to develop

languages and practices based on a mono-logic. One of the most important Milton Erickson's intuitions was to frame the patient and the therapy on more functioning levels at the same time working for mind-body healing. The Ericksonian perspective is supported in neuroscience field by evidences and tangible results which give it a value of great relevance especially now for creating the best future for the world of psychotherapy. Some important neuroscience findings confirm M.H. Erickson's intuitions on mind-body functioning. So we can define Erickson's work as a meta-model of healing (Rossi, 2002; Rossi et al. 2015) .

The advent of new extraordinary technologies in the various fields of knowledge is making the meeting among the different ways of doing research more possible. In this context of change, new ways of reading and interpreting the functioning of both human beings and groups are also becoming evident. For the first time psychology, medicine, as well as the world of education, social issues and culture can take into account as central issue the complexity of human beings with its numerous variables and multiple levels of analysis.

Only now for the first time, thanks to methodologies such as the Functional Magnetic Resonance Imaging and methods such as the DNA microarrays, we are able to imagine a relation between Mind and Body in its deepest meaning, see gene expression and protein synthesis. This new scientific approach (from Mind to Gene and vice versa) allows us to identify in an objective and functional way the influences that a certain level of functioning can have in real time on the other one in relation to the processes of memorization, learning, making sense and construction of knowledge, with reference to the world of education. While extraordinary scenarios are appearing also in health

research, consider the relevance this approach can have in the world of clinical psychology and mind-body therapies. In this perspective Rossi elaborated (Rossi, 2002; Rossi et al, 2006; Cozzolino et al. 2015) a new perspective in psychology taking into consideration different level of functioning from Mind to genes. This new approach in psychology can be well represented by Psychosocial and Cultural Genomics (Rossi, 2002, Cozzolino et al. 2015).

The Psychosocial and Cultural Genomics provides a reading of our way of functioning which takes into account at the same time different levels of analysis such as the social, cultural, psychological, cerebral, physiological and genomic dimensions.

It does not offer a biological and deterministic perspective about our behavior and/or our dysfunctions, just as a part of psychology and medical science often does. It is proposed neither a perspective according to which to the gene X corresponds the behavior Y, nor a point of view on the psychological factor as not relevant aspect, or dependent on the genetic matrix of our nature in respect of health, disease or our behaviors. The Psychosocial and Cultural Genomics in addition to representing an oxymoron, since it puts together words that are opposite among each others, provides a circular and integrated perspective within a simultaneously top-down and bottom-up matrix, defining a bidirectional path between Mind and Gene, without having meaningless divisions and barriers that lack in communicative dialogue.

The constructionist point of view on social and cultural dimensions which I am very concerned about, is included in this new perspective within an integrated and multi-level dialogue that is not considered just like it was in the past, namely like a process taking place around the subject or acting within him only at the psychological level. The construction activated by the social and the culture is much deeper and it is realized also at the level of mind-brain-gene communication. Thank to the extraordinary power of some meaningful emotional, social and cultural experiences that each of us lives with the others, it is possible to activate this cascade of changes and transformations of our psycho-bio-social-cultural identity.

Therefore, the Psychosocial and Cultural Genomics offers the possibility to go beyond the limits of a mono-logic perspective many epistemological models are based on, in order to access a multilevel point of view on our mechanisms of functioning.

The Psychosocial and Cultural genomics is modern discipline that represents an integration of biological, cultural and psychological disciplines with the aim to integrate the most recent knowledge in the fields of neuroscience, psychotherapy and genomics .

The research in Psychosocial Genomics aims to extend and integrate the neuroscience knowledge

base with the technology of gene expression via DNA/proteomic microarray research and brain imaging in development, stress, healing, rehabilitation, and the psychotherapeutic facilitation of existential wellness.

The rapport between Mind and Gene!

Over the past 20 years the conceptual relationship between genes and socio-environmental factors has been well investigated demonstrating that social stimuli can play a significant role in regulating the activity of human genes (Cole, 2013).

An increasing number of research in the field of genomics, neuroscience and mind-body medicine are demonstrating the molecular mechanism underlying the prospective health advantages associated with psychological well-being, providing scientific data to the clinical effectiveness of psychotherapeutic approaches and supporting, thus, a holistic perspective on humans, whose functioning depends on integration of biological, psychological, and social factors. Epigenetics is the field of research that studies the processes that regulate the interaction between genes and environment.

The development of the microarray DNA technology has made it possible to measure the expression levels of many thousands of genes simultaneously revolutionizing research in molecular biology and become a new standard in personalized medicine.

Infact, microarray technology provides the characterization of gene expression in human blood and represents an interesting and readily available source of information on genes and their associated molecular pathways involved in the signaling between physical and psychosocial environment and brain human functions.

Recent research demonstrates how genes interact with the environment to modulate behaviour and cognition in sickness and health showing the complex mechanisms that regulate gene activity.

These interactions involve a special class of genes, often described as activity or experience-dependent genes, which can be turned on (activated) by signals from the physical and psychosocial environment to modulate the complex functions of physiology and psychology (Rossi, 2002; Rossi et al. 2010; Rossi et al. 2015) So, an emerging area of research is the one that studies the ways and the extent to which psychosocial stressors can have dynamic, experience-dependent epigenetic effects on gene expression.

- Chronic diseases, anxiety, stress and psychiatric disorders are now understood as multi-factorial interactions between genes and/or gene/environment.
- The effects of psychosocial stress on our physiology, cellular biology, and ultimately

gene expression are likely mediated through multiple interrelated pathways: the hypothalamic-pituitary adrenal axis, the autonomic nervous system, and messengers of the inflammatory and immune responses

A recent research that documents how a number of **mind-body therapies** were able to reduce stress by eliciting the relaxation response (RR) that modulated gene expression.

Other studies reported that Stress Management **reduces gene expression related to pro-inflammatory biochemical pathways** in women affected by breast cancer.

In line with other studies in the field, we propose that **positive psychosocial experiences, interventions, and therapies may improve mental and physical health** through these same stress response pathways.

Other research (Rossi et al. 2010; Rossi et al., 2015; Cozzolino, 2015) documented how the **application of specific psychosocial intervention protocols and mind-body practices are able to modify leucocyte transcriptional dynamics in people confronting a major medical threat** (Antoni et al. 2013, Dusek 2008), counteract tumour growth-promoting processes (such as inflammation) and tumour defence processes (such as decreased cellular immunity) relevant for cancer progression, improving quality of life (Antoni et Al. 2013) and survival in cancer patients (Andersen, 2008).

Translational Psychosocial Genomics: Mind-Body Transformations Therapy (MBT-T)

The MBT-T is a new mind-body therapeutic approach that utilizes our natural 4-stage creative cycle for facilitating gene expression, brain plasticity and new consciousness to optimize problem solving in everyday life, promoting human resilience and resourcefulness for health, healing, and rehabilitation (Rossi et al., 2010). This approach is based upon principles of ericksonian hypnosis, implicit processing heuristics, the four-stage creative process, ultradian rhythms, the basic rest-activity cycle (BRAC), and neuronal and biological plasticity (Rossi et al. 2006).

This innovative psychotherapeutic approach is used to investigate translational mechanisms of healing on all levels from mind and brain to gene (Rossi, 2002; Rossi et al., 2010; Rossi et al. 2011; Rossi et al. 2013; Cozzolino et al., 2015) in order to explain how psychosocial experiences can modulate gene expression and brain plasticity to facilitate behavioral change at the molecular-genomic level.

Currently ***The Mind-Body Transformations-Therapy*** would seem to be the only evidence-based molecular-genomic approach to mind-body healing and problem solving that can facilitate within just one session:

- 1) stem cell activation**
- 2) reduction of chronic inflammation**
- 3) cellular oxidation.**

A 10 POINTS GUIDELINE FOR PATIENTS' MIND-BODY HEALING

The following guideline is the essence of our mind-body perspective as a consequence of the latest findings on mind-brain-gene communication. Starting from M.H. Erickson's intuitions on mind-body functioning, we present some important neuroscientific findings that confirm these intuitions (Cozzolino et al. 2014; Cozzolino et al.2015; Cozzolino and Celia, 2015).

The 10 points guideline can be used in the clinical intervention in order to lead the patients to healing. Thanks to these suggestions the psychotherapist can help the patients suffering from organic and/or psychopathological problems to reach a better mind-body integration.

These indications can perfectly fit into readers' clinical practice; independently from the clinical approach they already use defining Erickson's work and the psychosocial genomics as a meta-model of healing.

POINT 1-2 **THE ULTRADIAN RYTHMS** **AND CHRONOBIO-UTILIZATION**

Charcot, Janet, Jung and Erickson began to realize the importance of the natural rhythms in the awareness of healing, noting physiological changes and consciousness variations related to the rhythms of stress. Jung described the spontaneous changes in the level of consciousness connected to psychological problems and observed the stages between sleep and wakefulness as moments of high creativity. The therapist uses the knowledge of the chronobiological elements of human functioning, forms an alliance with the patient's biological times and makes the most of the organism's self-healing processes.

The ultradian rhythms represent a multi-oscillatory system of psycho-physiological processes which involve many parasympathetic functions, as well as functions connected to the right hemisphere, the gene expression and the protein synthesis, having a periodicity of 90 minutes in the 24 hours. The ultradian theory of hypnotherapeutic healing proposes the origin of psychosomatic reactions in the stress-induced distortions of ultradian cycles' normal periodicity. The naturalistic approach of hypnotherapy facilitates healing as it allows a normalization of these cycles. In fact Rossi's creative process follows the times of ultradian rhythms.

First phase

The therapist observes the neurophysiologic state of the patient to understand if he is in a state of arousal or relaxation. The indicators to be detected in the observation are:

DURING THE STAGE OF AROUSAL

- short and frequent breathing
- high muscle tension in the posture and facial

- muscles
- high speech rate AL
- high tone of voice
- frequent body movements and changes of posture

DURING THE STAGE OF RELAXATION

- deep and slow breathing, that is almost imperceptible
- slow speech with long pauses to find the right words
- deep and low tone of voice
- muscles relaxation in the posture and facial muscles
- gestures and posture stillness

Second phase

After having identified the physiological state of the patient, the therapist has to: strengthen, facilitate or enhance the ongoing physiological process whether it is an activation or a relaxation (Ericksonian principle of biological utilization), valuing it with sentences or positive nonverbal feedbacks.

What is not useful to do in a neuroscientific perspective

To inhibit crying, anger, agitation; to block; to fear; to explain in an excessively defined way what's happening; to interpret

What is useful to do

To support with a positive attitude the sensations related to the psychobiological state of the patient (the famous Erickson's *That's right*)

POINT 3

THE INTEREMISPHERE COMMUNICATION TO INTEGRATE OURSELVES

In many pathological conditions, although with different forms the two hemispheres do not communicate in an appropriate manner (trauma, PTSD, etc.). Even starting from a poor interhemisphere communication, you can promote a condition of greater communication and mind-body integration, increasing the chance of experiencing a deep wellbeing and gaining the right conditions to solve the problem.

POINT 3

First phase

The therapist observes the type of interhemispheric communication in the patient through a phenomenological reading of some signals which are expression of this communication:

A poor interhemispheric communication can be revealed by:

- Symptoms occurring in one part the body more than in the other;
- Poor body harmony;
- The patient experiences different sensations and perception: a part that is working and the other one which stands still as they are separate or extraneous.

A good interhemispheric communication is underlined by:

- Uniform sensations in body and mind, hands which are woven and held tight;
- A greater balance and integration between emotions, thought and action;
- A good ability of coming in contact with the self and one's own body;
- A good ability of learning, resting and recalling memories.

Second phase

Therapist's interventions

The therapist asks the patient to define with an adjective the sensations associated with the different parts of the body;

He encourages to listen to these differences;

He invites the patient to take all the time to grasp every evolution or change;

The therapist supports whatever happens;

He strengthen the ongoing mind-body process until something changes in patient's perception (reduction or disappearance of differences between one and the other part of the body, making the patient living indirectly the experience of the possible change);

The therapist enhances the value of this harmony leaving the patient free to express this new condition of integration.

POINT 4

THE HANDS FOR THERAPEUTIC ACCESSING TO THE BRAIN

Our patients' hands tends to make visible some aspects of the usually hidden and unconscious essence of problem solving and healing. The ideodynamic movements of their hands are fundamentally dialogues between the neural networks of their hippocampus and neocortex that attempt to integrate the old with the new at the levels of gene expression and brain plasticity.

First phase

To access the patient's internal world the therapist can try to stimulate and activate the patient not only mentally or psychologically as it happens under a traditional perspective, but he can do it especially by creating connections with the patient's brain and body.

Second phase

The therapist invites the patients to use hands while speaking and working on important issues concerning his problem, to make the most of the existing interconnections between this part of the body and the sensorimotor cortex (Penfield's homunculus). In this way the therapist increases the chances that the ongoing therapeutic experience creates even at the brain level conditions of activation that are more likely to stimulate the growth of new synapses and trigger that cascade

process which induces gene expression towards health and change.

POINT 5

THE REPLAY OF OFF-LINE MIND

Psychotherapists do not change or cure people in the consulting room; rather they simply facilitate novel thoughts and emotional experiences associated with the possible reconstruction of memory, learning, consciousness, and behavior. Later these novel thoughts and emotional experiences will be creatively replayed in dialogues between the cortex and the hippocampus during sleep and dreaming that explore their adaptive possibilities. It is this creative replay of these dream dialogues that generates gene expression and brain plasticity, which leads to the possibility of transforming consciousness and behavior that results in an adaptive change that is called, "a cure."

The mind-body system is not a static and formal system, it is rather a potentially adaptive system to the novelty which is generated within us.

The hippocampus is the first part of the brain, which records a memory of what we experience as new and surprising. However the hippocampus is the place where the new memory, the learning and the behavior are provisionally recorded. Later on, especially during the so-called "offline" periods and in the dream, when the conscious mind is not actively committed to deal with external realities, the hippocampus and the brain start a psycho-biological dialogue to update, repeat and consolidate in an adaptive manner the new experience of life. This psychobiological creative dialogue, made of unconscious and implicit replays is the very essence the four stage creative process is based on, that allows to build in an active way the necessary conditions to promote the resolution of complex problems.

First phase

The therapist asks the patient which and how many his off-line moments are, in order to make a precise recognition

Second phase

The therapist invites the patient to increase his off-line states explaining the importance of these moments for his process of change and psycho-physical health. Then, he instructs the patient on some techniques to induce the off-line (exercise with the fingers and creative process)

POINT 6

THE CREATIVITY LIKE STRATEGY FOR STRESS AND HEALING

In the real life, the events provide us with all the necessary material to identify the solutions of problems, but often the fundamental relations are hidden in space and time and hardly appear to a superficial observer. This means that people,

although having at their disposal all the tools to solve the various problems occurring during their daily life, often fail to creatively identify the best strategy to get out of the cognitive and emotional impasse. Although the ability of problem-solving can come from a person's intelligence, sometimes this person alone is not enough to identify a way to the solution.

Wertheimer says that "*the characteristics of genuine solutions are: not to be tied, blinded by the habits, just limited to submissively repeat what is taught, proceed with a mechanical way of thinking, with an eminently analytical attitude; but rather to freely observe the situations with an open mind, with an overall view, trying to find and understand how the problem and the situation are connected between each other, trying to figure out to the bottom of it, to realize, to highlight the internal relation existing between the form and the assigned task*".

First phase

In his work with the patient the therapist can facilitate the growth of unusual, strange, diverse sensations that initially can emerge in a feeble way.

Second phase

The therapist must recognize and reinforce even the smallest signals of change and give them back to the patient so that he also can pay attention to it.

This reinforces the patient's tendency to go towards new and positive things, taking the distance from old patterns and habits. The therapist provides the patient with a new way of learning and functioning which makes the change possible and sustainable.

POINT 7

THERAPEUTIC DISSOCIATIONS

The therapist can use therapeutically the natural predisposition of our organism to physical and psychological dissociation, in order to work towards the change. All this must happen naturally using at the best the mind-body dialogue already present in the patient but whose existence is ignored by him.

First phase

The therapist observes the patient's deep suffering without being scared of it, and he puts him in the conditions to feel not overwhelmed even when it seems insuperable, keeping the right distance from it. To create this distance, the therapist does not use the therapeutic language at his disposal, but he rather creates the conditions under which the natural possibilities of dissociation mind and body have can be activated just when the patient is experiencing his internal drama.

Second phase

The therapist opens a gap into patient's suffering offering a suggestion that encourages the patient to

feel himself suffering by focusing all the drama into a specific part of the body, but at the same time he helps him focus the attention on another part of the body or the mind where something more positive or less negative is felt. Another possibility to create this opening on the problem is inviting the patient to observe himself suffering while another part supports him, gives him empathy and everything he needs to deal with the problematic situation. These modalities of orienting the attention created by the therapist actually induce a natural dissociation within the patient, soothing his pain and the emotional burden, developing a new and different point of view on the problem (very important conditions to promote its solution). The therapist can say a part of you is like this in the problem while another part of you feels and sees all this in a different way (Ericksonian inner observer/healer).

POINT 8:
FROM THERAPIST'S BRAIN TO PATIENT'S BRAIN
IN FAVOR OF GOOD CONTAGION:
THE RESONANCE IN THE THERAPEUTIC RAPPORT

First phase

The therapist places himself in the condition to produce within his brain slower or gamma brain waves, aware that the resonance process and the mirror neurons will induce in the patient the same cerebral condition.

Second phase

Therefore the therapist works on his own breathing, his own heartbeat, towards a good mind-body communication, which creates the best conditions in his mind to activate a creative and therapeutic space and time.

POINT 9
ACTIVITY-DEPENDENT PLASTICITY AND
BRAIN'S CAPACITY TO REMODEL MEMORIES
AND LEARNING FOR HEALING

In the 1990's neuroscientists made the startling discovery that novelty, activity and enrichment actually turned on what they called activity and experience-dependent gene expression and brain plasticity.

Suddenly we had a new understanding of how trauma, accidents, and stress could actually wake up our DNA and signal our genes to make the proteins, hormones, neurotransmitters, and growth factors to activate our stem cells, which generate.

First phase

The therapist must know that learning, memories recall, health and change are significantly affected by the mind-body state the patient is in.

Second phase

In this sense, the therapist has to activate right physiological conditions to make learn or know what is necessary. It is essential to increase in the

patient personal moments of rest, use of creativity, interhemispheric communication, relationship with his hands, balance among the parts of the body, breathing, positive emotions, curiosity for new things.

Anything that is *novel, different or changing* in our life turns on *activity and experience-dependent gene expression and brain plasticity that creates new consciousness!*

If we do not have any novel or salient life experiences during the day many of these genes are not activated during REM sleep to facilitate brain plasticity, which generates the possibility of more adaptive behavior on awakening.

POINT 10
FROM DREAM LIKE UNCONSCIOUS DESIRE
TO DREAM LIKE NEUROSCIENCE REALITY

This implies a profound shift in our understanding the significance of memory and dreaming as records of the past to their significance for creating constructive possibilities for the future.

Vivid, dramatic, unusual and surprising dreams, which are typically experienced during life crises, are manifestations of the deep psychobiological arousal that modulate the gene expression/brain plasticity cycle to create, reframe and reconstruct consciousness and behavior in an adaptive and creative manner.

First phase

We usually awaken out of more cognitively oriented dreams that are closer to our goal-oriented conscious daytime thinking. From our point of view, the dreams are probabilistic simulations of past events and future expectations. The main function of such simulations would be to test specific novel behaviors against a memory replica of the world. This implies a profound shift in our understanding the significance of memory and dreaming as records of the past to their significance for creating constructive possibilities for the future.

Second phase

To enhance this possibility of becoming aware of the new options for more adaptive behavior generated during our REM dream episodes of gene expression and brain plasticity, we recommend that people take careful note of their "early morning thoughts" immediately on awakening in the morning.

A careful, receptive, and meditative attitude is a practice of self-care and self-facilitation that is most likely to access the adaptive transformations of consciousness and behavior that are explored during our dreams. This recommendation is consistent with research on meditative traditions that emphasize how the first early morning meditation is usually the best.

The technique that modulates brain waves to foster a better mind-body communication

Preface

This technique is originated by the interaction between eastern doctrines such as meditation and the scientific study of mind-body dialogue. It is the result of an integration among relaxation procedures, stress reduction and meditation that I, the undersigned, re-elaborated starting from modern neuroscience knowledge and clinical practice that I lead with research goals (Hirai, 1975, Schriner, 1990, Cozzolino, 2003).

The technique itself is the result of the encounter between past and present, eastern and western, religion and science. Starting from several learnings on mind-body dialogue, I analyzed a series of very interesting studies led in the seventies by Tomio Hirai, one of the most influential Japanese psychiatrist of that age (Hirai, 1975). His experimental studies with an EEG diagnostic tool put in evidence the extraordinary healthy effects generated on our brain from the ZAZEN practice (seated meditation). It deals with a style of eastern meditation transmitted to future generations with an inflexible discipline and put in practice by Zen friars over thousands of years. These distant experimental evidences together with a series of latest studies on the mind-body dialogue allowing me to reinvent the knowledge offering new patients another instrument to improve mind-body wellness.

Below describes the technique that modulates brain waves as I called it, its advantages and its use implications in psychotherapy.

Technique description and its therapeutic effects

This technique is the outcome of a set of other techniques derived from several sources (Hirai, 1975, Schriner, 1990, Rossi, 2002, Cozzolino, 2007). Its elaboration, as it is presented, has been developed by me and is the result of a clinic application and of a research lead on numerous patients. The name given to the technique "modulation of brain waves" arises from the effects that it produces on our mind and in particular on our brain waves.

The positions of the four fingers have the power to automatically change the physiologically part of our mind-body asset. They gradually manage to create an activation of the parasympathetic system and a change of hemispherical dominance. In turn this generated automatically a breathing and pulsation slowdown and a muscular relaxation.

With this technique, our usual brain operation with a left hemispherical dominance and characterized by an activation of sympathetic system, points at a right hemispherical dominance with an equivalent activation of parasympathetic system.

The possibility to change our mind-body asset is due to the fact that the different positions manage to modulate our brain waves. Usually, during our

activities, the brain releases waves of BETA that can heighten due to certain behaviors or stress.

This technique, in the first stage already, pushes naturally our brain to release slower ALPHA waves, characterized by a relaxed wakefulness that, in the second phase becomes even slower. In the third phase the technique produces typical sleep waves as Theta waves. At a later time, in the fourth phase the brain starts to produce Delta waves the very deepest level of sleep and mental relaxation. Through these four stages, fast and intensive waves are replaced by slower and larger waves that are typical of relaxation and deep sleep.

The effect on body and mind is extraordinary; it allows a deep condition of psychophysical wellness able to give the same effect of more than one hour of energizing sleep.

After ten minutes of using of modular technique of brain waves produce energies and resources that make you feel rested, refreshed and full of motivation can heighten due to certain behaviors or stress.

Actually, beside the psychophysical effect of wellness that the patient lives and tells, other important neuro-psycho-biological processes are activated such as the inter-hemispherical dialogue resulting in mind-body integration and a greater harmony that gives the feeling of being focused on himself and fully participant on both mental and physical side.

Over thousands of years the eastern friars (Indians, Japanese and Chinese) elaborated, through the meditation therapy, different postures of the body and of hands (see 5 Tibetans) that allow us, in the neuroscience age, to enclose in such a simple technique the natural flowing from fast brain waves to delta waves typical of deep sleep.

If studied experimentally, these secrets kept for many centuries can be applied at disposal of psychotherapy and all forms of treatments. In particular, through the modern neurophysiology we discovered evidences on our brain waves operation that underline the importance of the body as privileged passage to the mind. I dealt with a new, natural, realistic and neuroscience way of integrating and implementing in our profession learnings derived from disciplines, stories and languages all different from one another.

In this perspective, I realized a simple way to put at patient disposal a technique used directly by himself even outside the therapeutic setting. Therefore the patient is independent in putting in practice a strategy to face his psycho-physical difficulties, his anxieties and/or fears.

The consistent usage of the technique allows the patient to achieve several and positive therapeutic effects:

Having at his disposal an effective technique to manage anxiety and its difficulties on both prevention and critical situation

It allows a constant training to mind-body communication

It enhances inter-hemispherical communication
It encourages a regular balance between action and rest phase, naturally following the circadian rhythms of healing

It works independently in order to solve his problem, creating a proper mind-body mode of operation on which the psychotherapist intervenes with his clinical support

The production of alpha waves, as shown in many researches, empowers the creativity and the problem solving capacity.

Application and implications

Find a relaxing place where no causes of disturbance are present such as noises or vibrating or ringing phones. Sit on an armchair or a comfortable chair with legs placed on the ground and the back aligned to the seatback. Put both hands on the legs or on the armrest of the chair and keep eyes closed.

First phase

Be able to touch the extremity of the little finger with the extremity of the thumb.

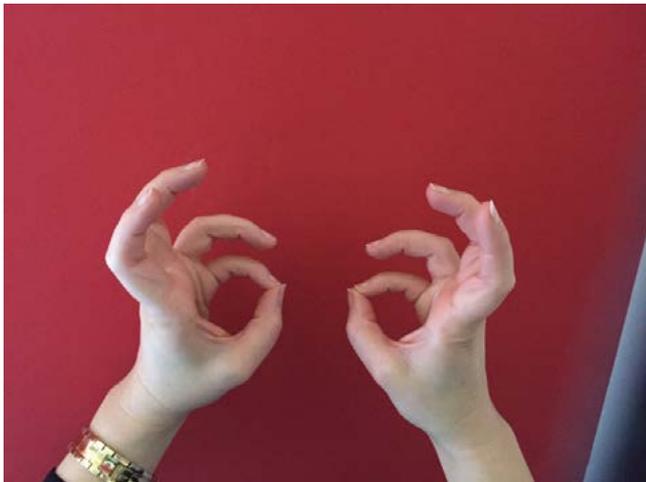


Figure 1.

Second phase

Be able to touch the extremity of the ring finger and the extremity of the thumb.



Figure 2

Third phase

Be able to touch the extremity of the middle finger and the extremity of the thumb.



Figure 3

Fourth phase

Be able to touch the extremity of the middle finger and ring finger with the extremity of the thumb.



Figure 4

All the passages must be done both with left and right hand simultaneously. It is important that the extremities touch each other perfectly.

Obstacles in the technique use

Initially the person can feel the flow of a stream or energy among the extremities of the fingers touching each other. It is absolutely common to become bothered however the activity must be continued. As time passes, the person will no longer feel uncomfortable and will experience a very pleasant sensation.

Another obstacle can be that of people thinking to be obliged to empty their mind on purpose and not succeeding in doing it, they think they are not able to apply the technique or they might even think of not having taken advantages of its strength. To solve this difficulty/ worry I do not suggest emptying the mind as it happens in other procedures

(meditation, autogenic training, etc.) I would rather recommend to address the mental attention to the body and its cues (minimal cues) whatever their form is, even if it deals with ailment or pain. Starting from this specific physical signal, that catches the attention of the patient in a precise moment, I recommend following it to see where it leads him. It could lead him in another part of his body or just change its form and its intensity. Well, I simply say to let his body express while the patient, gradually keeps changing the position of fingers according to the passing of time. That signal could transform in a thought, an image, a positive and bright emotion. In any case, I encourage and reinforce the possibility to welcome the nature the patient has in himself and I share the process with him.

Technique application of brain waves in psychotherapy

The technique that modulates brain waves fosters a fusion between static and activity. Mind is perfectly able to remain calm despite being simultaneously tense, awake and receptive to what is around.

During the first session the therapist should give the possibility to the patient to experiment, directly, the modulation technique of brain waves. In this way, he achieves different results in the same time:

- a. He can address the patient to a proper use of different phases and fingers' positions, guiding him to a valid execution.
- b. He can verify his willingness to trust the therapist following his directions. In some cases, when opposition or mistrust is present, the therapist can do the activity together with the patient. Strategically used, this sharing choice sets a more confident relationship in which the patient trusts the therapist and starts to relax.
- c. It can be used to receive feedback concerning the possibility to use more complex mind-body procedures such as MBT-T or the hypnosis itself.

The technique can be applied flexibly with a variable regularity according to therapist or patient needs. Basically in starting phase it should be used twice a day, morning and evening. In the morning it should be used when you wake up, before having breakfast and before concentrating on current issues. In the evening it can be used in bed, few minutes before falling asleep to induce sleep and to facilitate a better conscious/unconscious communication.

One of the extraordinary advantages in comparison to other mind-body methods such as autogenic training, mindfulness, meditation is the possibility to reach the above described effects without using the conscious/explicit mind (left hemisphere). The parasympathetic system activation, the right hemispherical dominance and the emission of slow waves through this

technique are the result of biofeedback natural mechanism that our organism has created over the years without using the control of mind over body. The modulation technique of brain waves uses psychobiological ways that are very different from those of other procedures and do not have the same limits. Before reaching a reasonable success in the application of other techniques is necessary a previous preparation, a kind of training and the perseverance in their application: these could be considered other mind-body procedures limits. Another limit is that the patients that really need to relax more from a psychophysical point of view do not succeed in doing it with procedures as autogenic training, mindfulness and meditation. On the contrary the modulation technique of brain waves trespasses these obstacles reaching the benefits above described simply using at the best, from a neuroscience point of view, the ways of mind-body connection.

The healthy effects on mind-body operation

The technique represents an extraordinary possibility to improve:

1. Mind-body dialogue
2. Inter hemispherical communication
3. Ultradian rhythms respect and their power to self-heal
4. Muscular and mental tension reduction
5. Anxiety prevention
6. Anxiety management in critical moments
7. Facilitates a better sleep- awake regulation
8. Reduces insomnia facilitating a more relaxing numbness
9. Increases problem solving capacity nurturing a greater creativity
10. Intensifies the resilience and the coping capacity
11. Facilitates a better congruence among emotions, consciousness and behavior
12. Re generation of energies and strength recovery
13. Equivalence with deep sleep
14. Empowerment of creativity, of coping strategies and problem solving
15. Facilitates the numbness and reduces insomnia.

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MY REFLECTIONS ON THE CANOE JOURNEY THAT EXPANDED A YOUNG MAN'S CONSCIOUSNESS, PAVING THE WAY FOR HIS FUTURE THERAPEUTIC STRATEGIES

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Twenty-four months after recovering from a severe, year-long episode of poliomyelitis, still barely able to walk without crutches, 21 year-old Milton Hyland Erickson undertook a journey that significantly expanded his consciousness, his outlook on life, and greatly influenced his lifework, as a medical doctor and hypnotherapist. A voyage, alone, in a 5 meter-long canoe, expanded considerably the young man's awareness of the world around him; chiseled his character; stimulating and opening-up his consciousness toward his multifaceted, infinite potential as a human being – a task of a lifetime.

What follows describe my reflections, my points of view about young man Erickson seventy-four day canoe voyage, a round-trip of approximately 1.932 kilometers. For nearly ten weeks – seventy-four days – the partially disabled young man paddled, solo, his fragile canoe through lakes Mendota, Monona, Waubesa and Kengosa, in Wisconsin and Illinois, in the heartland of the United States, all the way down to the powerful Mississippi river in Missouri. Then, he turned up-stream through the Illinois river, crossing back to the Rock river through the Hannepin canal, all the way home through the Yahara river and through the four lakes again, back to the familiar shores of his University, his *alma mater*, in Madison, Wisconsin.¹

Ancient stories, universal myths, and sagas describe human developmental passages – such as transition from youth into adulthood – through heroic, epic myths like *The Odyssey* or metaphorical stories or allegories such as *The Wizard of Oz*, and *Star Wars* (a myth for our times...). These, and all

others, in all cultures, from the dawn of civilization to our days, contain patterns in common, which mythologist Joseph Campbell described as a *monomyth* or 'the hero's journey'². Young man Erickson solo canoe trip contains many elements of these patterns, which are characteristic of 'the hero's journey'. Some of these are: a *call to adventure* – or, a *visionquest* - to which the protagonist responds; *separation from home* or from the familiar, and *departure* into the unknown. Another element, a *transition to the new reality* with daily challenges, hardships, and obstacles to overcome – were part of the young man's journey.

Young Erickson's journal entries reveal an indomitable spirit, determined to accomplish his goals. He answers to the *call to adventure* by plunging full-body into the unknown. He proceeds to travel alone, after his roommate backs up at the last minute (*a refusal to answer the call as per the monomyth*). He does not tell his mother and father – or anyone. He went alone: *a young man and his canoe*.

Along his 1.932 km journey, young Erickson, like the mythical Odysseus, encounters mentors, friendly helpers, and anonymous guides with summons for acquisition of new skills and knowledge. His journal entries describe, in a sincere and disciplined manner,



¹ If you are interested in locating these lakes and rivers to have an idea of the extent of young Erickson's heroic journey, please look up on your encyclopedias, Google, atlases, maps to read about the history and see the images of each lake and river. You can then travel in your imagination with him!

² JOSEPH CAMPBELL (2008, 3rd edition). *The Hero with a Thousand Faces*. Bollingen Series XVII, Novato, California: New World Library.

his outer experiences and his inner truths³. He writes everyday to his mother in Lowell, Wisconsin, and to a young woman back home, Ardath. She is, in essence, his muse, *his femme-inspiratrice*.

He takes German and Psychology books to study; he reads Tolstoy; he takes little clothing, and scant provisions: "I started out in the 5 meter-long canoe with a small bag of beans, and a small bag of rice, tin pails, a canteen, a skillet, a knife and fork, a hatchet, and two blankets. I picked up my living along the rivers, fishing, eating wild plants"⁴. Along the margins of the lakes and rivers, he helped fishermen, day laborers, and farmers with their chores (such as gathering eggs and milking cows!) in exchange for meals, shelter, and provisions. He also got paid for his work. Confronting daily dangers and ordeals transform the hero-protagonist, who grows as a person, gaining in wisdom, transcending his human limitations.

As a young man with handicaps Erickson paddles his canoe many hours each day. He camps ashore, crosses dams, and canals. He gains mastery on canoeing and portaging under considerable hardship. The seeds of his future therapeutic strategies appear to emerge from these experiences.⁵ What had been experienced the year-long he was immobilized, bedridden (1918-1919) with the polio sequellae, alone with his thoughts, explorations and experiences is now, in the summer of 1922, experienced with freedom to physically move about in "the great book of the world" (Descartes) ...

He overcomes each challenge day-by-day, moment-by-moment, mastering skills, freeing his spirit to soar high. He experiences *freedom to imagine, to experiment, to do, and to be*, which he will carry him throughout his professional and personal life.⁶ When he comes back, transformed, he will share with the world his highest values: he

will be a medical doctor, a researcher, a scientist, a mentor to many, and a healer to all who seek his wisdom.⁷

The return home, transitioning into adulthood. Finally, the hero returns home with a prize or reward, *empowered by a new identity* – the hero-protagonist, as Campbell suggests, is a *master of two-worlds*. The hero-protagonist Erickson will retain *mastery* of the lessons lived and learned throughout the journey, as he re-enters his world of everyday life. The last entry of his journal on August 27th, reads: "The end of a 1.932 km canoe trip: 1,610 km [that I] paddled; 323 km ridden on steamers [steam boats]; I worked my way [throughout]; studied hard; had a good time; I improved about 500% physically; 1.932 kilometers and I did it alone, despite doleful predictions – I am proud of my trip..."⁸ In addition to the physical, material gains, young man Erickson returns to his *Ithaca* with another prize – *the expansion of his consciousness* – firmly secured on autonomy, self-mastery, self-reliance, and an adult ethical posture.

He quotes J. K. Jerome: *Make a home, lad, for the woman who loves you; gather one or two friends about you. Work, think, and play. That will bring you happiness.*

Then, he quotes H.W. Longfellow... *Something attempted, something done, has earned a night's repose*. Then, he closes: "May each night's repose be earned!"

Note: A version of this narrative was published in English, in *The Milton H. Erickson Foundation Newsletter*, Summer/Fall 2014 – Vol. 34, n. 2; p. 8. Also, a version in French was published by *Hypnose et Thérapies Brèves, Revue Internationale de Langue Française*, n. 38, Août/Septembre/Octobre 2015, pp. 54-60

³ B.A. ERICKSON AND B. KEENEY (2006). *Milton H. Erickson, M.D. An American Healer*. Sedona, Arizona: Ringing Rocks Press; pp. 150-177. I invite you, the interested reader, to study this journal in depth.

⁴ RUBIN BATTINO (2008). *That's Right, Is It Not? A Play About the Life of Milton H. Erickson*, MD. Phoenix, Arizona: The Milton H. Erickson Foundation Press; pp. 153-156.

⁵ DAN SHORT, B.A. ERICKSON, AND ROXANNA ERICKSON-KLEIN (2005). *Hope & Resiliency. Understanding the Therapeutic Strategies of Milton H. Erickson*, M.D. Norwalk, CT: Crown House Publishing.

⁶ ERNEST ROSSI ET AL.(eds) (1983). *Healing in Hypnosis: The Seminars, Workshops, and Lectures of Milton H. Erickson*. Vol. I. New York: Irvington.

⁷ JEFFREY ZEIG AND MICHAEL MUNION (1999). *Milton H. Erickson*. London: SAGE Publications.

⁸ B.A. ERICKSON AND B. KEENEY (2006); pp. 177.

The Beginner's Mind

THE COLLECTED WORKS OF MILTON H. ERICKSON

VOLUME 3 - OPENING THE MIND

REVIEW BY RICHARD HILL MA, MED MBMSC, DPC, SYDNEY, AUSTRALIA

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I just spent a week with Milton Erickson. He opened up his patient records and, through the lens of his many fascinating cases, he carefully discussed the most important things about being a therapist. What must it have been like for Ernest Rossi, Jeff Zeig, and the fortunate others who were able to spend time with Erickson, in person? Extraordinary.

Volume 3 opens and closes with a section of transcript of a conversation/session between Erickson, Rossi and Erickson's physician and friend, Dr Marion Moore. Rossi had requested that therapeutic hypnosis be used to, "Open my mind to learning everything I need to know to become a good practitioner of therapeutic hypnosis." (p.xi) They talk about dolls with purple hair, sunbathing, ironwood art, pretty girls and Barney, the dog. In a feat of Ericksonian magic we end up in "... the real essence of this session: Opening the Heart!" (p.xxv)

Each of the four parts of this volume is prefaced with some dialogue between Erickson and Rossi. These set the stage, but also make me feel I truly am in a conversation, too. Part 1 reminds us that utilization is where "... every individual's abilities and inner resources must be accessed in order to determine how they may be evoked and utilized for therapeutic purposes." (p.1) This is what we need to do. We are also delightfully reminded of what not to do - "Too many therapists take you out to dinner and then tell you what to order." (p.2) The next 280 pages are filled with case studies that look deeply into the foundations of therapeutic practice.

Most of the cases are from the 1950's and 60's, but they may as well be from last week. The editors have utilized a wide array of therapeutic contexts, everything from examination panic to ejaculation praecox. Each treatment seems so different. How can a single therapist have so many therapeutic 'tricks' up their sleeve? The answer is quite simple: to be client responsive. Therapy needs to "... always be in relationship to the client's capacity to receive and understand." (p.31) Modalities are not the center of therapy - it is the client. "... hypnosis was used solely as a modality by means of which to secure their co-operation in accepting the

therapy they wanted." (p.68). It is also the resonance between client and therapist where it is vital to be "... doing what appears most important to the client." (p.102)

Part 2 illustrates Erickson's indirect approaches to symptom resolution. In Chapter 13 Erickson and Harold Rosen expand on the function of a patient's symptoms which are much more than just what appears on the surface. Ernest Rossi has later described this as "the symptom path to enlightenment" and which I colloquialize a little more as "the problem is a message". Erickson shows how therapeutic hypnosis can make it possible for the patient to express or even act out the problem/symptom. This section takes you into very difficult cases of people suffering from difficult sexual and bodily function issues.

What it shows is that a neurological issue can be expressed in the body and expressed through the body - what goes on above the neck is connected to below and vice versa. The answer is to see the patient as a whole, dynamically interactive expression of whatever the condition might be. There is no duality, even though such thinking still exists in some quarters.

The work of Rossi and others in psychosocial genomics makes it absolutely clear that activity dependent gene expression, which is stimulated during therapy, is a systemic and dynamic function that impacts the entire organism. This means that what, how and where therapy is applied can have a much wider scope than simply reproducing a modality. Therapy is guided by both the information embedded in the symptomology and the capacity of the therapist to both know and intuit what might lead to beneficial change. What is the message the symptoms are trying to represent? What is the path they are seeking to illuminate? What is the therapeutic response that will help the client? These are the fundamental elements in the dynamic interplay of therapeutic practice and this is what we are encouraged to appreciate in these extraordinary case studies from Erickson's files.

Part 3 has a special focus of sexual and sexuality issues. The 1950's was an era when sexual issues were still a very sensitive topic. These cases teach much about therapeutic practice, but also give an historic cultural snapshot.

Part 4 takes us in a slightly different direction – self exploration. I assumed this to be about the therapist, but it is also very much about the patient. It opens with a Rossi-Erickson dialogue about the effects of “To watch it but not experience it.” (p.208) Being able to take an objective position allows the patient to be freed from their “... biases of distaste.” (p.209) This sounds similar to our modern discourse of externalizing the problem and of separating the issue/behavior/affect from the person. Therapeutic hypnosis enables and allows the patient “... to achieve a detached, dissociated, objective and yet subjective view...” (p.211).

The therapist must also observe “... from everyday life...”, something for which Erickson is renown. This observation and subsequent awareness “... is the best approach to opening your

mind to becoming a better psychotherapist.” (p.276)

The volume finally returns to the session between Erickson, Moore and Rossi as they discuss the myriad of cues and clues that emerge during the therapeutic experience. Everything from minor facial expressions to metaphors to a casual comment can provide a rich resource. To be a good therapist takes an open heart, an open mind, subjective and objective awareness, a keen sense of noticing and being able to see the illumination of the path to enlightenment for both patient and therapist. The final words of the volume capture it, in all its simplicity:

Rossi: So we have to find out how to read faces. We have to find out how to read inflection of words, minimal cues that the patient gives about their underlying problem. That's what this is all about.

Erickson: Yes.

Rossi: That's a lot of work! You don't just sit there and talk and empathize.

Erickson: Yes!

PSYCHOLOGY IN BLACK AND WHITE: THE PROJECT OF A THEORY-DRIVEN SCIENCE

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He has lectured and held seminars at various universities flow around the world.

About the Book:

The book is made up of 364 pages and it is divided in three parts:

Part I: Chapter 1 to Chapter 4

First part is devoted to presenting a semio-dynamic model of sensemaking (SDMS). In chapter 1, some preliminary considerations are provided in order to frame the presentation of the model presented in the following chapters. Then, Professor Salvatore, outlines the pragmatic and processual view of meaning that is the grounds of the SDMS:

"The meaning of any sign is not the content of the sign itself. Rather, it is produced by it due to the way it

combines with previous and following signs namely, its position in the context."

According to such a view, sensemaking can be seen as an infinite flow of signs, each of which has the bivalent function of interpreting the previous sign and triggering the following one. Chapter 2 is devoted to presenting the basic concepts of the SDMS. In particular, two core ideas are discussed.

- First: meaning is the emerging field property of sensemaking.
- Second: the idea that sensemaking works through the interplay of the two components: SIP and SIA.

Chapters 3 and 4 complete the presentation of the SDMS, sketching out the micro-dynamic that brings about the semiotic processes as envisaged by the model.

Part II: Chapter 5 to Chapter 8

The chapters in this second part are devoted to developing the theoretical implications of the SDMS outlined in first part. The aim of this part is to develop the heuristic richness of the SDMS in terms of its capacity to foster an innovative approach to psychological theory. A rather radical view that is committed to providing new definitions of basic psychological categories.

Part III: Chapter 9 to Chapter 12

The third part of the book is devoted to outlining this new methodological framework.

Chapter 9 provides a discussion about the logic of knowledge construction that is consistent with the field nature of sensemaking. Chapter 10 discusses the need to re-think the subject of the analysis in a dynamic and situated way, going beyond the reified notion of the individual.

Chapter 11 proposes some strategies of analysis grounded on the methodological framework.

In the end, chapter 12 presents some instances of empirical investigations that instantiate the methodological tenets presented in the previous chapters.

This work represents the important contribution of Professor Sergio Salvatore to the development of modelistic psychology. It is grounded on the foundational idea that sensemaking is the object of psychology.

In this book the reader can find an improved definition of complex concepts, just approached in others publications of the author, for example:

"The Reciprocal Inherency of the Self and Context. Notes for a Semiotic Model of the Constitution of Experience"

or

"Field and Dynamic Nature of Sensemaking. Theoretical and Methodological Implications"

The innovative ideas introduced in the previous articles have been matured during the last years, and exposed clearly and with the use of effective examples.

Some of the innovative concepts introduced in this work are:

The concept of Mind, seen as a product in relation with the context, and so, the idea that the mind is not just held within the skull, finds a great many supporters.

The Context itself has been defined and how this relation with the mind works specifically. Psychology and more in general the social sciences have proposed many theories of the context, each of them providing an interpretation of the way mind and world are related. Environment, activity, culture, intersubjectivity, social representations, collective unconscious, Dasein, otherness, language game, frame, voices: these, and others, are terms denoting the many ways of interpreting the entanglement between mind and context and the role the latter plays in psychological phenomena.

In this book the reader will find also the correlation between Sign and Meaning.

The meaning is the sign that follows.

In order to underline how many contents the sign may have, the polisemy of the sign, the author uses the expletive example "S is a girl":

"For instance, to say "S is a girl" can mean not only |S is not a boy|, but also |S is not a woman|, |S is not an old person|, but also |she is not a serious person| and so forth."

"What is relevant here is not only that there are several possible meanings associable with the act of using a sign, but above all that such meanings are potentially infinite, depending on the specific, contingent local conditions of the communication, namely on the previous historical trajectory of signs characterizing the local discursive activity."

To have a more complete idea of context, meaning and sign, I invite the reader to open the book, find the chapter, and experience her/himself how deep is this relation.

In Conclusion:

The innovative ideas exposed in this book are supported by a great set of scientific articles, that guarantee a high level of support to the ideas presented in the book.

Professor Salvatore, as evidenced by his biography, enjoys high reputation both nationally and internationally, the book "Psychology in Black and White: The Project of a Theory-Driven Science" allows the not yet experienced reader to approach clearly and directly to these innovative findings, while for the more experienced player is a long awaited book within the creative field of cultural psychologies contemporarily.

It is a theoretical synthesis that is at the level of the greatest ones have brought into psychology over the past century.

Unlike most of those works, Salvatore's aim is to define a fundamental model of sensemaking, a model depicting its basic, constitutive dynamic.

Special Thanks to the Proofreader Clementina Nappi.

HOW THE REAL WORLD IS DRIVING US CRAZY!

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Richard Hill was mentored by the esteemed Ernest Rossi PhD who invited him to the International Psychosocial Genomics Research Team which studies the impact of therapeutic practices on the genetic level.

He is also President of the Global Association of Interpersonal Neurobiology Studies (GAINS), and an Esteemed Member of the International Council of Professional Therapists.

Richard Hill has presented to conferences around the world. He is a regular presenter at the Milton Erickson Foundation conferences in the USA.

All the interested can easily find accurate info and addictive videos on his website:

<http://richardhill.com.au/home>

The book:

The book is made up of 235 pages and it is divided in three sections:

The First section could be seen as an introduction to the ideas of "Real World", "Winner/Loser World" and "Creative World".

The Second section give a deeper look to the ideas introduced in the previous section, through the use of stories, case examples and parables that highlight the principles described.

The Third section is the section of possibilities and is projected to future ideas and knowledge.

In the text we find a great number of examples and images that make the reading both interesting and comfortable. Those examples help the reader to understand the inner meaning of concepts as "The Real World".

What is the Real World?

The Real World is the world where we live every day. A frenetic and chaotic world, lived by employers, students, taxi-drivers...a jungle, where

the individual has to fight to improve himself and become a "winner".

"The Real world is the place we find, when we turn back from the holiday"

This world could be seen also as a "Winner/Loser world". A world where we constantly battle to be winners and not losers (or less losers). The trouble is that it is the external world that says whether you are winning or losing and the rules keep changing. We are too this and too that and not enough this or enough that.

Hill describes the situation of many individuals in this world in progress, an epidemic unhappiness that is manifesting through fear, loneliness, depression, isolation, drug abuse, suffering of relationship and suicides.

In particular, suffering of relationship and suicides are highlighted. In a Winner/Loser world there is not enough time for the family and the relations. This situation implies a gradually involving of these important aspects of our life. In this context the individual expresses the destructive symptoms we mentioned. The extreme one is the suicide that is clearly increased in under 45 age bracket, during the last decade.

This world could not be changed from the inside. Being happy in the Winner/Loser world is surprisingly difficult.

"The more we try to fix it, the more we amplify the problem."

The individual needs an innovative approach to the world, a metaphorical SHIFT to the "other world".

What kind of "other world" we are referring to?

A Creative World. A world of relationship, love, kindness and sharing. The differences between these two worlds, could be resumed in eight pairs of words:

If the reader finds her/himself approaching her/his experience in the ways of the left hand list, then it is reasonable that she/he is operating in a Winner/Loser way. However if the reader finds her/

EXCLUSION	INCLUSION
EVENT	LESSON/OPPORTUNITY
INSTRUCTION	INFORMATION
COMPETITION	INSPIRATION
RESULT	OUTCOME
PROBABILITY	POSSIBILITY
TRANSACTION	INTERACTION
ARROGANCE	CONFIDENCE

himself approaching her/his experience in the ways of the right hand list, it is reasonable that she/he is operating in a creative way.

As mentioned, these eight pairs of words represent two completely different approaches to life: the creative approach and the destructive approach.

In this work Richard Hill predicted the importance of the inclusion of the last decade. The inclusion is becoming an important aspect not only in the pedagogical system but also in the social system.

The media too often inform us about a tragedy due to community's bullying or ethnic intolerance.

In order to increase the creative process is

essential to include as many elements as possible. INCLUSION is more than just be TOLERANT:

"...the tolerance is a benign form of exclusion that make we APPEAR to be inclusive..." "To include is to take things as they come and as they are and allow them to be creative elements of our experience"

In the book we will also find an innovative approach to problems generally. As one of the six principles explains: "The Problem is a Message". The problem seen in the "Winner/Loser world" is something that needs to be fixed, it is something wrong, a barrier of success. In the creative world the problem is a symptom of something which we are not aware or we are not noticing. A problem is an opportunity and an inspiration to discover the underlying issue.

Conclusion:

I did only a little resume of some aspects of the creative world approach. I invite all the interested to have a personal experience of the work of Richard Hill "How the 'real world' is driving us crazy!" reading his book or taking place to one of his spectacular conferences. "How the 'real world' Is Driving Us Crazy!" is not just another self-help manual to overcome our struggles, but it is a profound social comment that presents a new world view.

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