

The Milton H. Erickson Institute of the California Central Coast

**THE NEW NEUROSCIENCE OF
PSYCHOTHERAPY, THERAPEUTIC HYPNOSIS
& REHABILITATION:
A CREATIVE DIALOGUE WITH OUR GENES**

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CHAPTER 1

An Introduction to Milton H. Erickson, M.D. (1901-1980)

Milton H. Erickson, was described as “one of the most influential psychotherapists of all time” in a recent survey by *The Psychotherapy Networker* (March 2006). In psychotherapy Milton H. Erickson is ranked among the Top Ten along with Sigmund Freud, Carl Jung and others. Here is their brief portrait of Erickson written about him a generation after his passing.

“Despite everything that's been written about Milton Erickson and the diligent efforts of so many to understand just what he did in therapy and why it worked so remarkably well, an air of mystery surrounds his work even now. Shortly after Erickson's death, his 20-year student Jay Haley said, “Not a day passes that I don't use something that I learned from Erickson in my work. Yet his basic ideas I only partially grasp.” The image of Erickson that's emerged in the field is that of a therapeutic wizard possessed of an overwhelming personal power.

“He wasn't the kind of person you'd just sit down and chat with,” recalls Jeffrey Zeig. “He was consistently working, consistently being Milton Erickson, which entailed having the most profound experience he could with whomever he was sitting with. In that sense, he was constantly hypnotic, constantly therapeutic, constantly teaching.”

Perhaps this was because Erickson's physical state necessitated the complete focus of all his faculties. Dyslexic, tone deaf, color blind, prone to vertigo and disorientation, stricken with polio at 17 and again at 51, he spent the last 13 years of his life (the period in which many of his well-known students first met him) painfully confined to a wheelchair. As he tried to model the flexibility and subtle verbal methods he'd spent a lifetime developing, he did so with partially paralyzed lips and a dislocated tongue.

Yet, as Haley said, “the man worked 10 hours a day, six or seven days a week doing therapy. . . . Every weekend, he was either seeing patients or on the road teaching.” Zeig adds: “The thing that was so impressive about Erickson was the time and energy he was willing to put out. Once he took somebody as a patient, he'd, literally, do anything he possibly could to help that person. When you were a client of Erickson, you just felt he was totally focused on you.”

Erickson spent a half-century developing an enormously subtle therapy of multileveled pattern recognition that was almost totally at odds with the mainstream therapies of his day. “Maladies,” Erickson said, “whether psychogenic or organic, follow definite

patterns of some sort, particularly in the field of psychogenic disorders. A disruption of this pattern can be a most therapeutic measure, and it often matters little how small the disruption is, if introduced early enough."

He discovered that most of the "rules" of life prescribing human limitations were arbitrary beliefs, not facts. His study and mastery of hypnosis taught him that altered mental states and trance were very much a part of everyday functioning. "This understanding," wrote Ernest Rossi, "formed the underlying principles of his later studies of psychopathology as well as his development of the naturalistic and utilization approaches to therapeutic hypnosis."

Such insights were fundamental to Erickson's approach, but he sought no definite theory to pass on as a legacy. "Erickson has no set method," Haley noted. "If one procedure doesn't work, he tries others until one does. That's what he emphasized to his students, advising a stance of heightened receptivity uncontaminated by formulaic preconceptions." Erickson put it this way: "I don't attempt to structure my psychotherapy except in a vague, general way. And in that vague general way, the patient structures it... in accordance with his own needs... The first consideration in dealing with patients is to realize that each of them is an individual... So in dealing with people, you try not to fit them into your concept of what they should be... You should try to discover what their concept of themselves happens to be... It isn't the amount of time. It isn't the theory of therapy. It's how you reach the personality by saying the right thing at the right time."

Further words of wisdom from Erickson: "Trust your unconscious. It's a very delightful way of living, a very delightful way of accomplishing things." And: "Don't try to use somebody else's technique... Just discover your own."

We believe these words, *"Don't try to use somebody else's technique... Just discover your own"* are very important for therapists who wish to learn about themselves as well as Erickson. Therapists usually learn through trial and error the ways in which their unique personality can be most effective in helping others. This requires courage, persistence, and honesty by each psychotherapist. It can be a lonely task learning how to do this.

Who can possibly know better than you, yourself, when you are at your best and most effective in facilitating others? It requires careful and continuous self reflection about what one is doing. No two people are exactly alike. No two therapeutic sessions can be exactly the same. Each therapeutic session is a unique creation, a unique piece of self development in the genesis of new consciousness and self identity in the patient and therapist. We expect that our empathy, understanding, and therapeutic efficacy will grow with each human encounter day by day.

This essay for licensed professionals presents a new neuroscience perspective on psychotherapy, therapeutic hypnosis, and rehabilitation as highly personal and creative

dialogues with our genes. While this presentation is implied by much of the research we will quote, a great deal of further research will be needed to establish its scientific validity and therapeutic efficacy. We outline a number of “experiential processes” as guiding heuristics for therapeutic work. They are not, however, validated methods behavior change at this time. Rather, our approaches should be regarded as personal forms of self development in the humanistic arts, autobiography, and meditation. They may be useful in the creation of new consciousness, self knowledge, and self care that are of value to individuals who practice them, but they are not medical or psychological prescriptions for everyone. We begin with a brief overview of some of our creative approaches in the history of the arts, medicine, and psychotherapy as well as evolving neuroscience.

Creative Implications

- Learning from others is only a beginning.
- Each therapist must develop their own special talents.
- Daily creative effort is required to optimize therapeutic skills.
- Each therapeutic session is a unique creation.

CHAPTER 2

Historical Sources of the New Neuroscience of Psychotherapy, Therapeutic Hypnosis, and Rehabilitation

The earliest sources of psychotherapy and therapeutic hypnosis began almost 300 years ago with Anton Mesmer's defense of his medical thesis *Dissertatio Physico-Medica de Planetarum Influxu* on May 27, 1766. This was the time of the Swiss philosopher, Jean-Jacques Rousseau (1712-1778), when there were philosophical clashes between the mechanistic and naturalistic views of human nature. Rousseau believed humans experienced developmental stages and that the "exercise" of mental abilities facilitated the growth of the brain. Charles Bonnet (1720-1793), an experimental naturalist familiar with Rousseau's views, proposed to the Italian scientist Michele Vincenzo Malacarne (1744-1816) that neurons could respond to exercise just as muscles do. Malacarne (1793, 1819) then carried out experiments with littermates of birds and dogs. He observed that those exposed to enriched environments and intensive training had larger brains! This was the forerunner of modern neuroscience research documenting how novelty, exercise, training, and the voluntary focusing of attention can facilitate the growth and re-organization of neural networks of the brain. This is the foundation of our current conceptions of how gene expression and brain plasticity in psychotherapy, therapeutic hypnosis, and rehabilitation can facilitate human development and healing (Rosenzweig, 1996, Rosenzweig, et al., 1962, Renner & Rosenzweig, 1987).

The Physiology of Fascination in Therapeutic Hypnosis, Psychotherapy, and Modern Neuroscience

Medical pioneers such as Anton Mesmer (1734-1815) and James Braid, M.D. (1795-1860), who originally explored therapeutic hypnosis as a method of healing, had little understanding of how it actually worked. For example, James Braid's defines hypnotism in his 1855 book, *The Physiology of Fascination* as follows:

With the view of simplifying the study of reciprocal actions and reactions of mind and matter upon each other... the (hypnotic) condition arose from influences existing within the patient's own body, viz., the influence of concentrated attention, or dominant ideas, in modifying physical action, and these dynamic changes re-acting on the mind of the subject. I adopted the term "hypnotism" or nervous sleep for this process ... And

finally as a generic term, comprising the whole of these phenomena which result from the reciprocal actions of mind and matter upon each other, I think no term more appropriate than 'psychophysiology' (Braid, 1855).

It is now believed that Braid actually invented the term “psychophysiology” to describe how mind and matter interact with each other to facilitate mind-body healing via therapeutic hypnosis (Tinterow, 1972). Even today, 150 years later, exactly how psychophysiology operates in mind-body therapy is not well understood. There are no generally recognized departments of therapeutic hypnosis or mind-body therapy in our universities and medical schools that conduct systematic research on these therapies. Within the past generation, however, the new discipline of neuroscience has emerged with the advent of new technologies for the scientific investigation of the natural relationships between mind and body that Erickson (1958/2008, 1959/2008) called his “naturalistic” and “utilization” techniques of hypnosis. Functional magnetic resonance imaging (fMRI), DNA microarrays, and bioinformatic DNA databases, for example, have made a great deal of research available, which we will briefly review to update our understanding of therapeutic hypnosis, psychotherapy, and rehabilitation.

We will carefully summarize the implications of current neuroscience in a series of pictures illustrating the pathways of mind-body communication that we utilize in our therapeutic work. We will then illustrate some innovative approaches that are easy to learn and practice in professional workshops for licensed therapists. We have taught Erickson’s “naturalistic” and “utilization” approaches in professional workshops throughout the world for more than 40 years. We present a few of them in carefully structured outlines for licensed professionals in this essay (Rossi, 2002a, 2004a). We illustrate how they are capable of infinite variation by more experienced therapists.

Throughout these practical exercises we will note where more research is now needed to meet the criteria of evidence based medicine (EBT). Indeed, we invite you to cooperate in an open source research program with us on an international level (Rossi, Rossi, Yount, Cozzolino & Iannotti 2006). The Ernest R. and Josephine R. Hilgard Award for Best Theoretical Paper in 2001, from *The Society for Clinical and Experimental Hypnosis*, reviews the scientific background of the creative approaches we outline (Rossi, 2000). More detailed expositions may be found in textbooks (Rossi, 2002a, 2002b, 2004a, 2007), videotapes, and CDs available from the Milton H. Erickson Foundation Press (Erickson, Rossi, Erickson-Klein & Rossi, 2008) as well as pioneering professional publications in creative hypnosis (Bloom, 1990).

Creative Implications

- Novelty, exercise, training, and focusing attention can facilitate brain growth.
- The hypnotic condition arises from influences existing within the patient.
- The implications of neuroscience are a new research base for psychotherapy.
- Erickson’s “naturalistic” and “utilization” approaches are for licensed professionals.

CHAPTER 3

A New Neuroscience Model of the Four Stage Creative Process in the Humanities, Science & Psychotherapy

A cartoon of the classical four stage creative process is presented in figure one, illustrating a student engaged in proving a mathematical theorem (Tomlin, 2005). The first two panels represent *Stage One of the creative process* where “the wheels start turning” in the mind and the student begins making diagrams and writing equations trying to solve the problem.



Figure 1: The four-stage creative process. Stage one is getting an idea and starting to work on a problem. Stage two is the sometime difficult experience of struggle and conflict trying to solve the problem. Stage three is the creative moment of getting a flash of insight. Stage four is one of happy verification of the problem solution. (With permission, Tomlin, 2005)

As is typical of many problem solving efforts in everyday life, the student soon finds himself in difficulties. He feels “stuck” in *Stage Two of the creative process*, when his emotional conflict and despair is evident in the middle panel humorously showing smoke arising from his overheated brain. *Stage Three of the creative process* is illustrated in the next panel as a flash of light surrounds his head. He is so surprised by his new creative insight that he drops his pencil! *Stage Four of the creative process* is evident as smiles with happiness with his success and exclaims, “Magic!” The popular lore of healing with psychotherapy and therapeutic hypnosis has frequently been described as magic. But how does this magic work? Here we will outline a new neuroscience model of how this so-called “magic” may operate in normal everyday life, our dreams, and psychotherapy as a creative dialogue with our genes.

The Mind-Brain-Gene Dialogue

Creative Replay as the Essence of Psychotherapy

Figure two illustrates a profile of the human brain with a cutout showing details of the hippocampus, which is the part of the brain that first records a memory of what we experience as new and surprising. The hippocampus, however, is only a temporary resting place for recording new memory, learning, and behavior. Later, during so-called “offline” periods of sleep, dreaming and rest when the conscious mind is not actively engaged in coping with outer realities, the hippocampus and the brain engage in a dialogue to update, replay, and consolidate the new life experience in an adaptive manner.

Lisman & Morris (2001) describe this updating dialogue as follows:

“...newly acquired sensory information is funneled through the cortex to the hippocampus. Surprisingly, only the hippocampus actually learns at this time — it is said to be online. Later, when the hippocampus is offline (probably during sleep), it replays stored information, transmitting it to the cortex. The cortex is considered to be a slow learner, capable of lasting memory storage only as a result of this repeated replaying of information by the hippocampus. In some views, the hippocampus is only a temporary memory store — once memory traces become stabilized in the cortex, memories can be accessed even if the hippocampus is removed. There is now direct evidence that some form of hippocampal replay occurs... These results support the idea that the hippocampus is the fast online learner that “teaches” the slower cortex offline.” (p. 248-249, italics added)

This “updating dialogue,” which proceeds on an unconscious or “implicit level” is the essence of our new neuroscience model of creativity in psychotherapy. It only seems like a kind of “hidden magic” to our conscious mind when we awaken from sleep, dreaming, and deep states of inner focusing in everyday life. We are surprised to realize we are aware of something new. As we shall soon see, the creative replaying of adaptive, novel, and significant life experiences between the cortex and the hippocampus is the basic life process that we seek to facilitate in psychotherapy, therapeutic hypnosis and rehabilitation. This entirely natural “psychobiological dialogue” is the essential process that we attempt to facilitate in our new neuroscience model of creative therapeutic suggestion. From this new neuroscience perspective therapeutic suggestions may be more aptly described as “implicit processing heuristics,” which facilitate this natural dialogue between the hippocampus and the cortex as illustrated in Figure two.

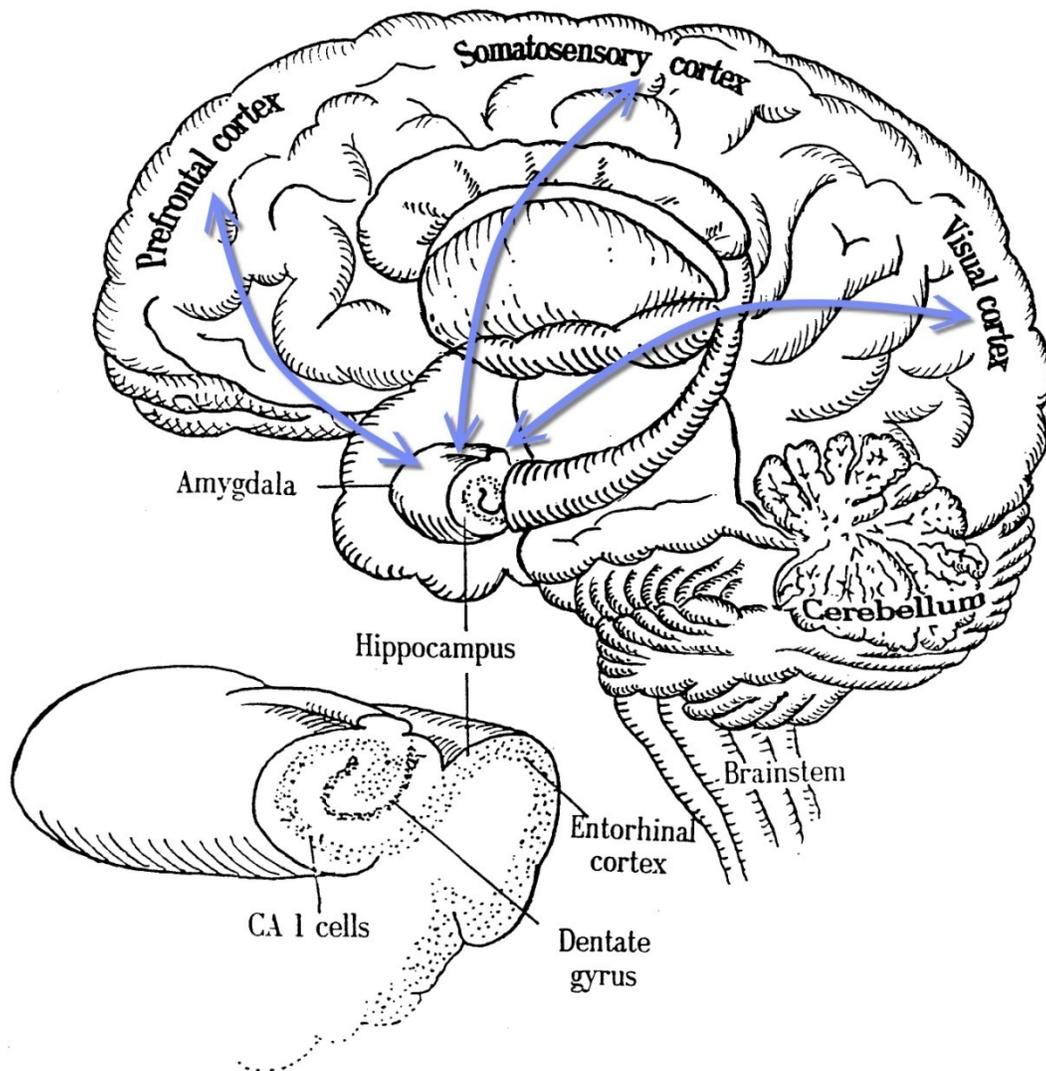


Figure 2: A profile of the human brain during “offline” periods of sleep, dreaming and rest when the hippocampus and the cortex engage in a dialogue (blue arrows) to replay, update, and consolidate the new memory and learning (Updated from Rossi, 2002a). This entirely natural psychobiological “dialogue” is the essential process that we attempt to emulate, facilitate, and utilize in our new neuroscience model of implicit processing heuristics.

The Human Brain and the “Rapport Zones” Of Psychotherapy and Therapeutic Hypnosis

Figure three illustrates some of the “rapport zones” on the cerebral cortex, which we believe are the actual areas of the human brain that are engaged in the creative dialogues of psychotherapy and therapeutic hypnosis (Rossi & Rossi, 2006).

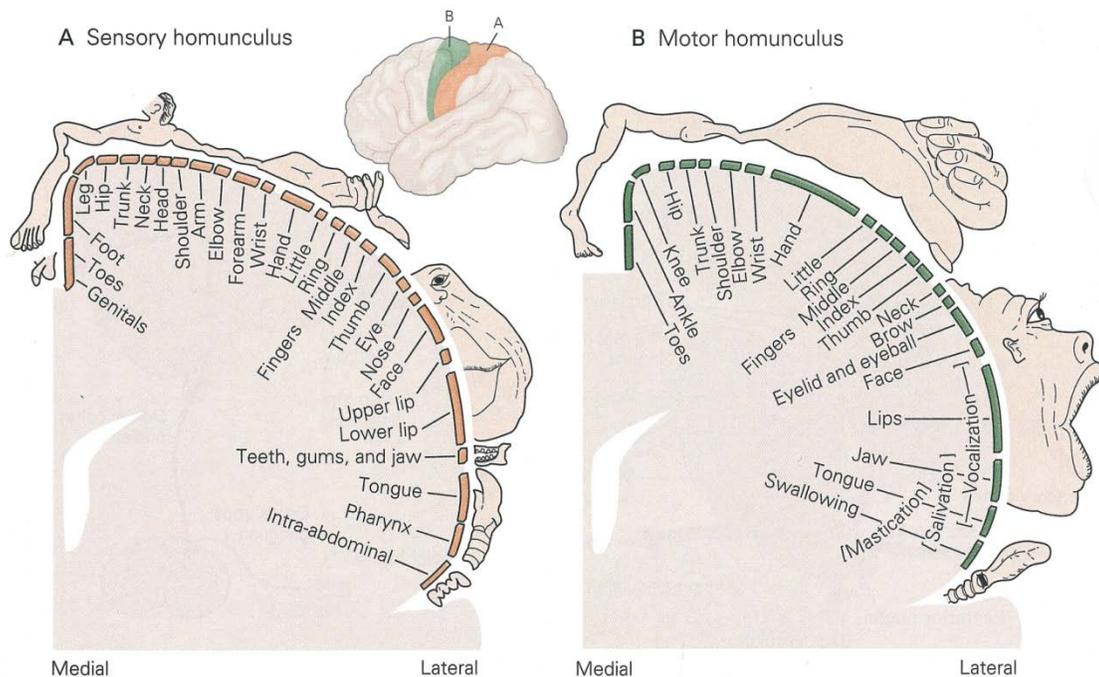


Figure 3: The Mind-Body Human Sensory-Motor Homunculus. The oversize hands and lip-tongue-facial anatomy reflect the unusually large areas of the brain that evolution has selected to map these two important areas of grasping and communication (Adapted from Penfield & Rasmussen, 1950). A. The sensory homunculus is postulated as being activated in a set of “rapport zones” via the ideo-sensory processes of therapeutic hypnosis. B. The motor homunculus is postulated as activated in a set “rapport zones” during the ideomotor processes of therapeutic hypnosis.

Mind-Body Communication

The Basic Rest-Activity Cycle (BRAC)

The time frames on the right side of figure four illustrate another profoundly important aspect of mind-body therapy. Mind-body communication, via our nervous system, takes place almost instantly in milliseconds. The flow of mind-body communication via molecular messengers such as hormones in the blood stream throughout the body, however, requires about a minute. When these signals are received by cells, many of them are communicated to the nucleus of the cell where they “turn on” gene transcription (gene expression).

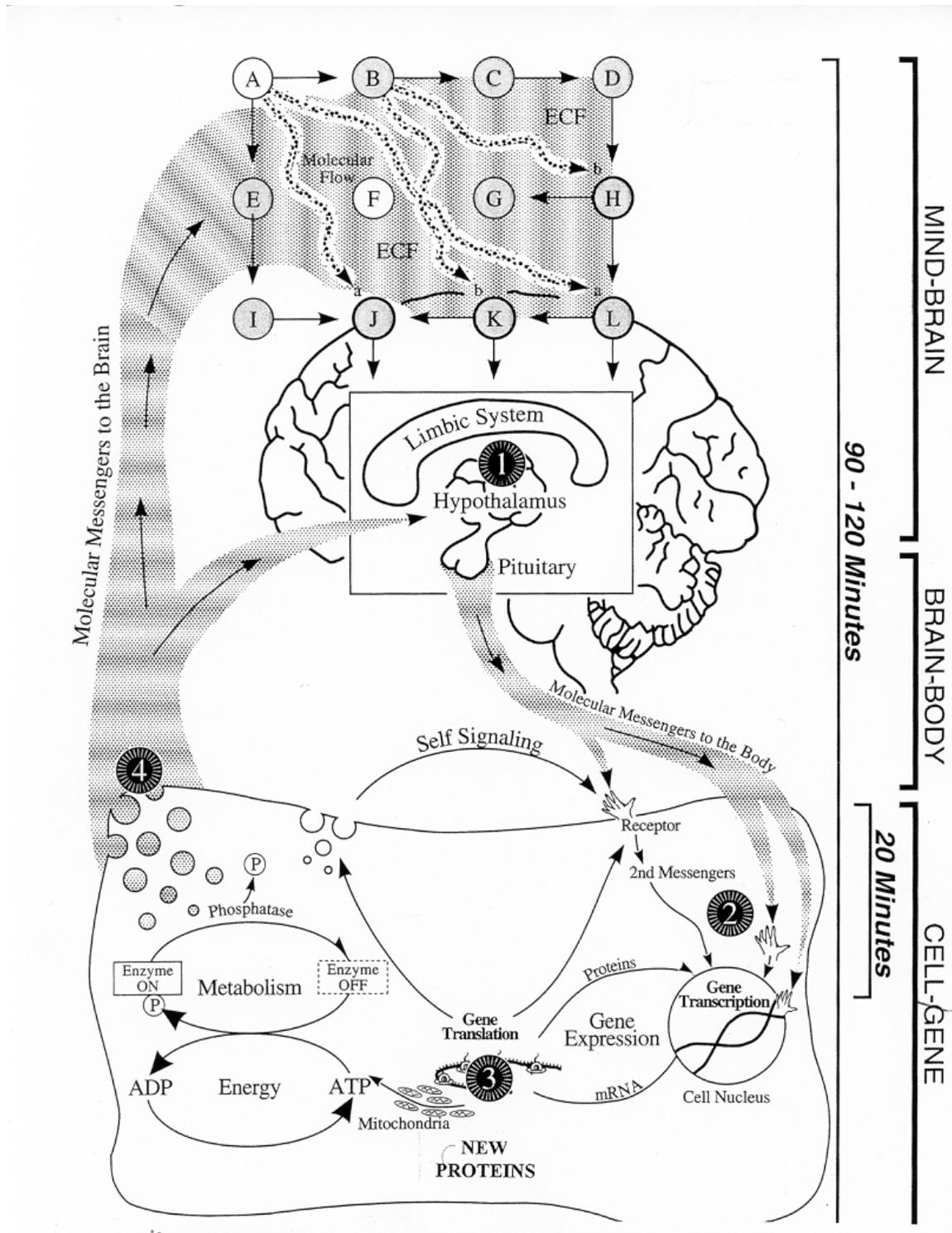


Figure 4: Four levels of the psychobiological domain of psychotherapy, therapeutic hypnosis, and rehabilitation. (1) Information from the outside world encoded in the neurons of the cerebral cortex of the brain is transformed within the limbic-hypothalamus-pituitary system into the messenger molecules that travel through the blood stream to signal receptors on cells of the brain and body. (2) Receptors on the

surface of cells transmit the signal via 2nd messengers to the nucleus of the cell where immediate-early genes signal other target genes to transcribe their code into messenger RNAs. (3) The messenger RNAs serve as blueprints for the synthesis of proteins that will function as (a) the ultimate healing structures of the body, (b) enzymes to facilitate energy dynamics and (c) receptors and messenger molecules for the informational dynamics of the cell. (4) Messenger molecules function as a type of “molecular memory” that can evoke state-dependent memory, learning and behavior in the neural networks of the brain (illustrated as the rectangular array of letters A to L on the top). (From Rossi, 2002a, 2004a, 2007)

Genes express a DNA code to make proteins that are “molecular machines” that can carry out the physical healing in mind-body therapy. As illustrated in figure four, an entire cycle of mind-body communication and healing—as well as the ordinary activities and performances of daily life takes about 90-120 minutes—this is sometimes called an “*Ultradian Cycle*” (in contrast to the “*Circadian*” or daily 24 hour cycle). In chronobiology (the biology of time) it is also called “The Basic Rest-Activity Cycle” (BRAC) (Lloyd & Rossi, 1992, 2008). This means that a fundamental unit of mind-body communication in therapy can be initiated and take place within the typical time parameters of a single session of psychotherapy or therapeutic hypnosis. It is noteworthy that Milton H. Erickson (Erickson, Rossi, Erickson-Klein, Rossi, 2008), generally regarded as one of the most innovative psychotherapists of our time, typically conducted his sessions of therapeutic hypnosis for 90-120 minutes.

The operation of the BRAC within a single neuron of the brain is illustrated in figure five. *New, surprising, and unexpected life experiences can turn on “activity-dependent genes” important for making the proteins, which generate the growth and transformations of the synaptic connections between neurons that is described as “brain plasticity” (Rossi, 2000, 2004a, 2007).*

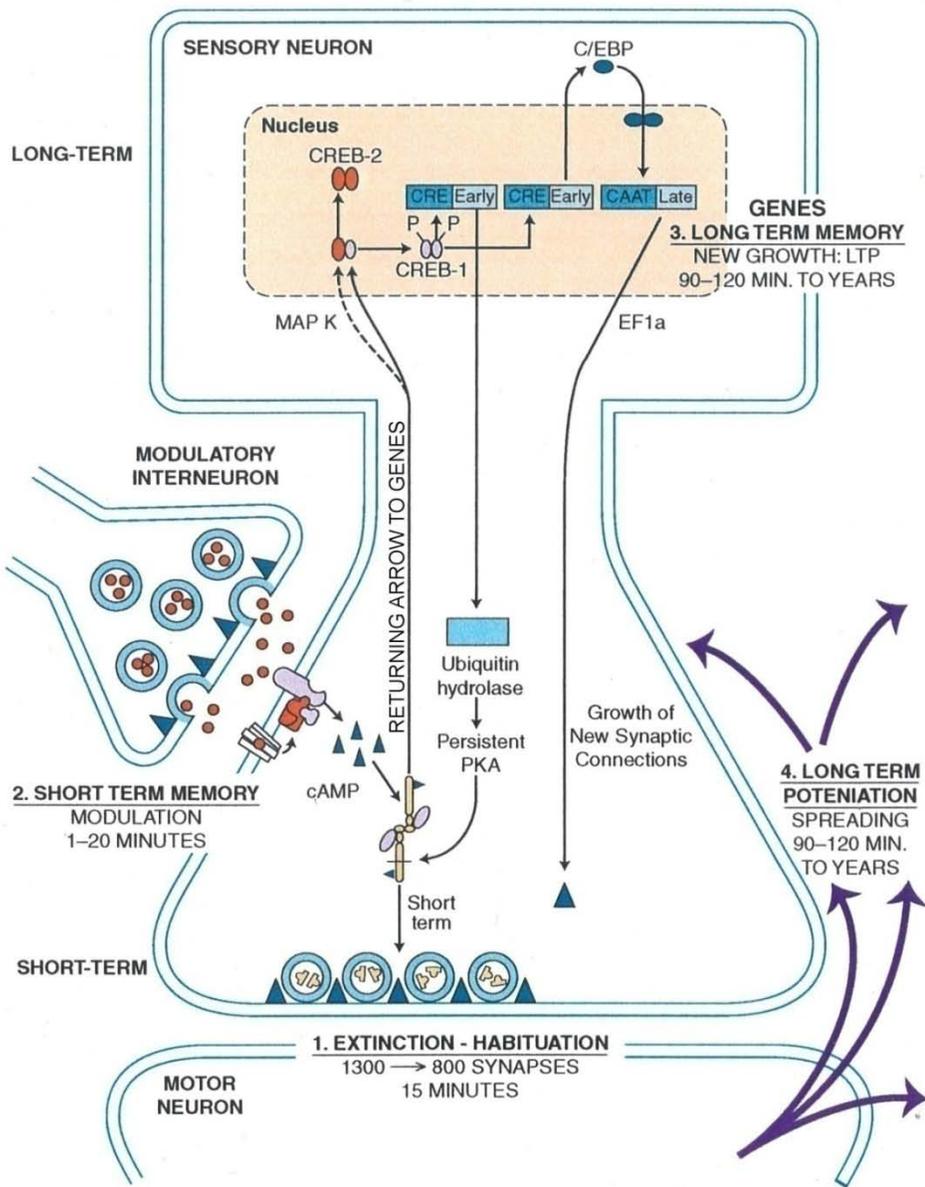


Figure 5: The time parameters of the ultradian basic-rest activity cycle illustrating how neurons in the brain, when stimulated by novel and salient signals from the environment, actually turn on activity-dependent gene expression, new protein synthesis, and brain plasticity. (Adapted from Kandel, 2001, 2006; Rossi, 2002a, 2004a, 2007).

The illustrations of this chapter provide a brief overview of the new neuroscience model of the creative process from mind to gene, which we will now explore in greater detail.

Creative Implications

- We utilize a new neuroscience model of the creative process from mind to gene.
- Facilitating our natural mind-brain-gene dialogue is the essence of psychotherapy.
- An entire cycle of mind-body communication and healing takes about 90-120 minutes
- Psychotherapeutic experiences can turn on genes and brain plasticity in a single session.

CHAPTER 4

Gene Expression, Brain Plasticity and Time in Psychotherapy

Gene expression and brain plasticity are the physical basis of the natural transformations of mind, consciousness, and behavior. Figure 6 illustrates how new synaptic connections are formed between neurons every hour or two of the basic rest-activity cycle. Our neuroscience model of psychotherapy and therapeutic hypnosis via a creative dialogue with our genes utilizes this entirely natural time frames of life that have evolved over millions of years of evolution. Direct evidence for gene expression and brain plasticity facilitated by psychotherapy is being rapidly documented at this time (Kandel, 2001; Lichtenberg, et al., 2000, 2004; Rossi, 2002b, 2004b, 2005-2006, 2007, 2008). Evidence for the involvement of gene expression and brain plasticity in psychotherapy was originally emphasized by Eric Kandel (Kandel, 2001, 2006), who recently won a Nobel Prize for his lifetime of research in this area. Kandel (1998) states this perspective as follows:

“Insofar as psychotherapy or counseling is effective and produces long-term changes in behavior, it presumably does so through learning, by producing changes in gene expression that alter the strength of synaptic connections and structural changes that alter the anatomical pattern of interconnections between nerve cells of the brain. As the resolution of brain imaging increases, it should eventually permit quantitative evaluation of the outcome of psychotherapy ... Stated simply, the regulation of gene expression by social factors makes all bodily functions, including all functions of the brain, susceptible to social influences. These social influences will be biologically incorporated in the altered expressions of specific genes in specific nerve cells of specific regions of the brain. These socially influenced alterations are transmitted culturally. They are not incorporated in the sperm and egg and therefore are not transmitted genetically.” (p. 460, italics added)

Research with the combined technologies of DNA microarrays, functional magnetic resonance (fMRI), and bioinformatic data bases such as the Allen Brain Atlas of gene expression <http://www.brainatlas.org/aba/> are now needed to meet the requirements of evidence based medicine for the involvement of gene expression and brain plasticity in psychotherapy.

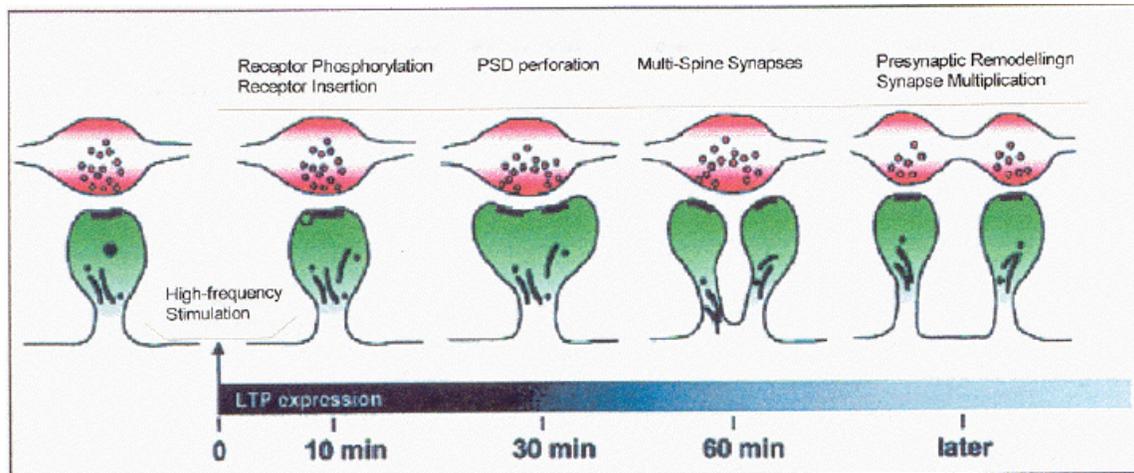


Figure 6: The ultradian (time) dynamics of activity-dependent memory, learning, and behavior change as proposed by Lüscher et al., (2000). Within the first 10 minutes there are measurable changes in gene expression and the activation (phosphorylation) and growth of receptors that are involved in synaptic communication via neurotransmitters. Within 30 minutes the size of the synaptic spine increases and receptors move to the postsynaptic membrane; this leads to an increase in the size of the postsynapse. Within an hour, some postsynapses divide in two. This leads, in turn, to further growth in presynaptic multiplication and remodeling that eventually create new neural networks encoding memory, learning, and behavior change that is of essence for psychotherapy and many activity-dependent processes of gene expression, protein synthesis, and synaptogenesis during creative human experiences in the arts and sciences as well as everyday life. Research suggests that four weeks to four months are required to stabilize new neural networks encoding new memory and learning (Van Praag et al., 2002). This simple fact suggests the natural time parameters for the neuroscience of brief psychotherapy and rehabilitation.

Darwin, Evolution, Adaptation and Time for Healing

In an unusually prescient statement of his natural selection theory of adaptation, Charles Darwin (1859) intuited what we now describe as the natural time parameters psychotherapy as follows:

It may be said that natural selection is daily and hourly scrutinizing, throughout the world, every variation, even the slightest; rejecting that which is bad, preserving and adding up all that is good; silently and insensibly working, whenever and wherever opportunity offers, at the improvement of each organic being in relation to its organic and inorganic conditions of life. We see nothing of these slow changes in progress, until the hand of time has marked the long lapses of ages, and then so imperfect is our view into long past geological ages, that we only see that the forms of life are now different from what they formerly were. (Italics added here)

Figure seven illustrates profile of psychotherapy as a four stage creative process that takes place every 90-120 minutes of the basic-rest-activity-cycle.

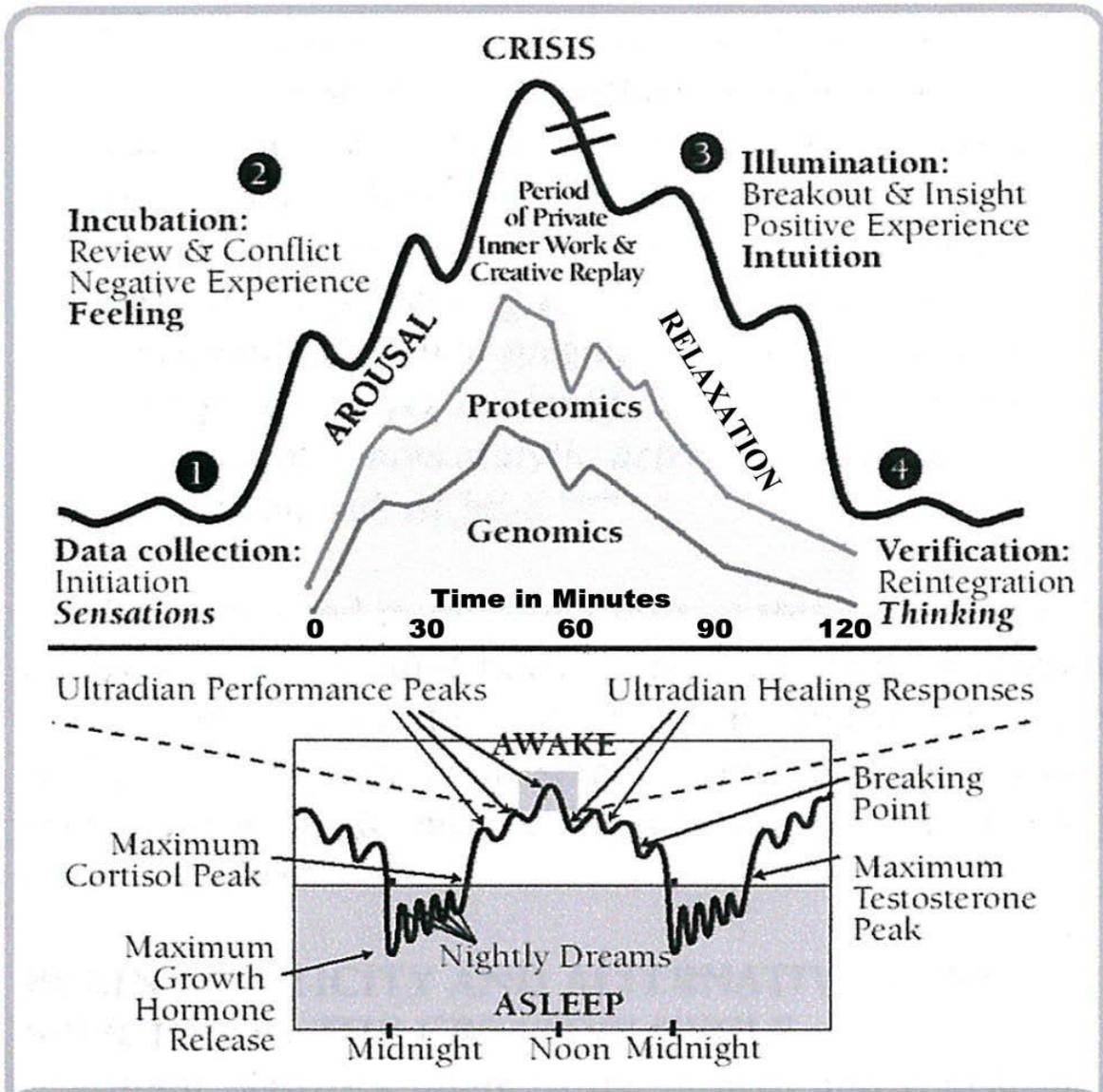


Figure 7: A profile (90-120 minutes) of the 4-stage creative process in psychotherapy is illustrated in the top portion of this figure (upper curve). The proteomics (protein) profile in middle curve depicts the energy landscape for protein folding within neurons of the brain required for brain plasticity. This proteomic profile arises from the functional concordance of co-expressed genes illustrated by the genomics profile below it. This genomics curve represents the actual gene expression profiles of the immediate-early gene *c-fos* and 10 other genes (alleles) over the typical Basic Rest-Activity (BRAC) period of 90-120 minutes. The lower diagram illustrates how these ultradian dynamics of consciousness are typically experienced as Kleitman's 90-120 minute Basic Rest-Activity Cycle within the normal circadian cycle of waking and sleeping (Rossi, 2002b, 2004b, 2007; Rossi and Nimmons, 1991).

The Ultradian Healing Response and the Ultradian Stress Response

Table one outlines how the four stage creative process can be experienced as either an “ultradian healing response” or an “ultradian stress response.” Which response we choose depends on whether or not we allow ourselves to enjoy the natural rest-healing phase of the cycle. We propose that *chronic stress induced by ignoring and over-riding this natural Rest Phase of the Basic Rest-Activity Cycle is a primary source of psychosomatic problems that can be resolved with mind-body therapy via therapeutic hypnosis* (Lloyd and Rossi, 1992, 2008; Rossi & Nimmons, 1991).

**Table 1. A Comparison of the Ultradian Healing and Stress Response
As a Life Style Choice (Rossi & Nimmons, 1991).**

THE ULTRADIAN HEALING RESPONSE	THE ULTRADIAN STRESS SYNDROME
<p>1. Recognition Signals An acceptance of nature’s call for your need to rest and recover your strength and well-being leads you into an experience of comfort and thankfulness</p>	<p>1. Take-a-Break Signals: A rejection of nature’s call for your need to rest and recover your strength and well-being leads you into an experience of stress and fatigue.</p>
<p>2. Accessing the Deeper Breath A spontaneous deeper breath comes all by itself after a few moments of rest as a signal that you are slipping into a deeper state of relaxation and healing. Explore the deepening feeling of comfort that comes spontaneously. Wonder about the possibilities of mind-gene communications and healing with an attitude of “dispassionate compassion.”</p>	<p>2. High on Your Hormones Continuing effort in the face of fatigue leads to the release of stress hormones that short-circuits the need for ultradian rest. Performance goes up briefly at the expense of hidden wear and tear so that you fall into further stress and a need for artificial stimulants (caffeine, nicotine, alcohol, cocaine, etc.).</p>
<p>3. Mind-Body Healing Spontaneous fantasy, memory, feeling-toned complexes, active imagination, and numinous states of being are orchestrated for healing and life reframing. Some people take a “nap.”</p>	<p>3. Malfunction Junction: Many mistakes creep into your performance, memory, and learning; emotional problems become manifest. You may become depressed or irritable and abusive to yourself and others.</p>
<p>4. Rejuvenation and Awakening A natural awakening with feelings of serenity, clarity, and healing together with a sense of how you will enhance your performance and well-being in the world.</p>	<p>4. The Rebellious Body Classical psychosomatic symptoms now intrude so that you finally have to stop and rest. You are left with a nagging sense of failure, depression, and illness.</p>

Figure eight illustrates the changing domain of therapeutic hypnosis during a facilitation of the basic rest-activity cycle (BRAC) in mind-body therapy on all levels from mind to gene. Characteristics of the initial arousal stage of the BRAC have been described as “high phase hypnosis” or “alert hypnosis” wherein outer performance in work and play can be optimized. This is in contrast with “low phase hypnosis” wherein mind-body healing can be facilitated most easily and naturally. Notice how this natural continuum of activity and rest can accommodate and resolve many of the apparently opposite features of the major “psychosocial” (high phase) and “special state” (low phase) theories of hypnosis (see special issue of the *American Journal of Clinical Hypnosis* (Lankton, 2007).

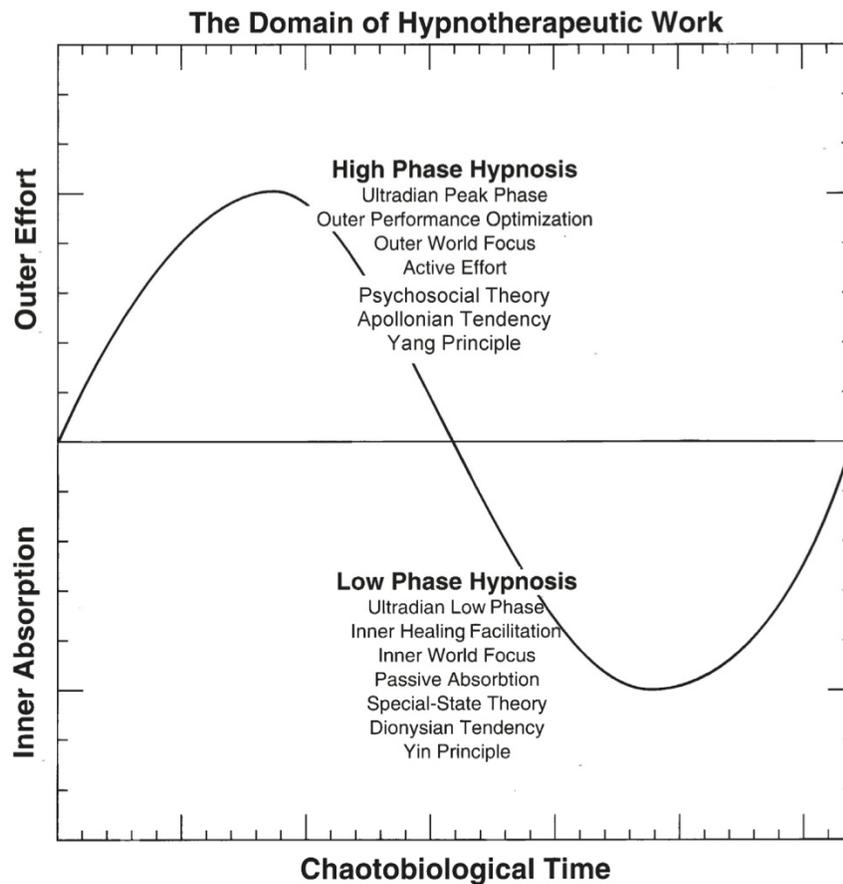


Figure 8: The domain of therapeutic hypnosis that is hypothesized to range between high and low phases during the natural basic rest-activity cycle in chronobiology (chaotobiological time). (From Rossi, 1996)

The natural time parameters of gene expression and brain plasticity are important in our lifestyle choices. We can choose to heed our natural mind-body signals for activity and rest in everyday life. We can make a choice between the ultradian healing response or the ultradian stress response every 2 hours or so throughout the day. These lifestyle choices are the deep psychobiological foundations for our new neuroscience theory of mind-body communication and healing from mind to gene.

Creative Implications

- Gene expression and brain plasticity are the physical basis of our natural transformations of mind, consciousness, and behavior.
- Modulation of gene expression by social factors makes all brain & bodily functions susceptible to social influences.
- We can make a choice between the “ultradian healing response” or the “ultradian stress response every 2 hours or so throughout the day.”
- The *Activity Phase* of the BRAC (“high phase hypnosis”), which can optimize outer performance in work and play, alternates naturally with the *Rest Phase* (“low phase hypnosis”) when mind-body healing can be facilitated most easily.

CHAPTER 5

Life Turning Points: An Evolutionary Perspective on Self Creation, Dreaming, and the Constructive Mind

From our new neuroscience perspective, vivid, dramatic, unusual and surprising dreams, which are typically experienced during life crises are manifestations of the deep psychobiological arousal that evoke the gene expression/brain plasticity cycle to reframe and reconstruct consciousness and behavior in an adaptive and creative manner. Figure 9 outlines the adaptive dynamics of mind-body healing during important life turning points.

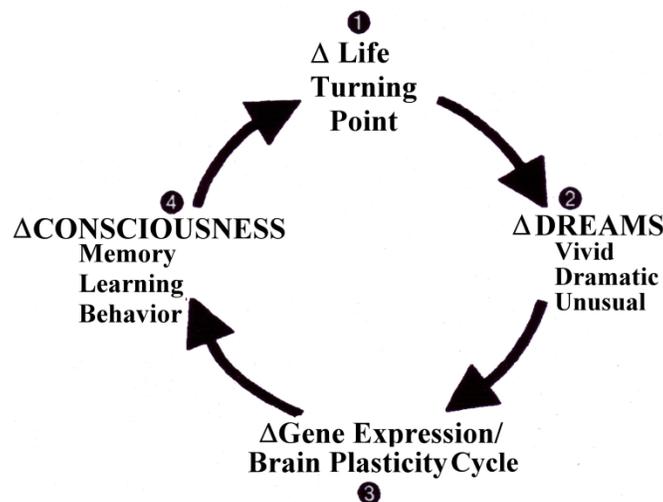


Figure 9: The adaptive dynamics of mind-body healing during important life turning points. Vivid, dramatic, unusual, and surprising dreams (REM sleep) that are experienced during life crises may be manifestations of deep psychobiological arousal that evoke the gene expression/brain plasticity cycle to reframe and reconstruct consciousness, memory, learning and behavior in an adaptive and creative manner. The little delta symbol (triangle) means that a change at any of these four major levels of mind-body information transduction generates a mathematical transformation to the next level in an infinite spiral of never ending developments in human consciousness and experience.

The dynamics of Figure 9 are aptly outlined by Ribeiro (2004) in his evolutionary theory of sleep and dreaming as follows:

“We now come to the central hypothesis of the theory, namely that mammalian 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, rather than the real world itself. This hypothesis is a generalization of the threat simulation theory of dreaming... dreams may either simulate actions that lead to a desirable outcome and therefore should be performed in the real world, or actions that lead to undesirable consequences and therefore should be avoided in the real world.” (p.12)

How Novelty, Environmental Enrichment and Physical Exercise Consolidate Memory via Brain Structures

Ribeiro, et al., (2004) summarized their research on novelty induced gene expression and transcription during dreaming that provides the cellular basis of brain plasticity as follows:

The discovery of experience-dependent brain reactivation [of salient daytime experiences of novelty, environmental enrichment and physical exercise] during both slow-wave (SW) and rapid eye-movement (REM) sleep led to the notion that the consolidation of recently acquired memory traces requires neural replay during sleep... Our results indicate that persistent experience-dependent neuronal reverberation is a general property of multiple forebrain structures. It does not consist of an exact replay. Recent neuroscience research has found that when we experience significant novelty, environmental enrichment and exercise during the awake state, the zif-268 gene is expressed during our REM sleep (Ribeiro et al., 2002, 2004). Zif-268 is an immediate-early gene and behavioral-state related gene that is associated with the generation of proteins and growth factors that facilitate brain plasticity... In conclusion, sustained neuronal reverberation during SW sleep, immediately followed by plasticity-related gene expression during REM [dreaming] sleep, may be sufficient to explain the beneficial role of sleep on the consolidation of new memories.” (p. 126-135, italics added)

More recently Ribeiro et al., (2008, in press) reviewed research that documented how the gene arc and zif-268 both are activated to facilitate brain plasticity to encode novel and enriching life experiences in an adaptive manner as follows.

In a follow-up study (Ribeiro et al., 2002), we found similar results when exposure to novel environment was replaced by the induction of long-term potentiation (LTP) in the hippocampus, a well-known neurophysiological model of memory (Bliss and Collingridge, 1993). Our experiments revealed a sequence of three spatiotemporally distinct waves of zif-268 expression, beginning locally at the hippocampus 30 minutes after stimulation, still during waking, and proceeding to distal extra-hippocampal areas during the two subsequent REM sleep episodes. Each zif-268 up-regulation wave was interrupted by the next SWS episode, indicating the existence of recurrent plasticity cycles as the two sleep states alternate.

In 2005, our reports of experience-dependent up-regulation of *zif-268* mRNA during REM sleep were extended to other plasticity-related molecules by an independent research team. The study, which employed the active avoidance learning task as a behavioral paradigm, linked REM sleep and pontine waves typical of that state to the experience-dependent up-regulation of *arc* and brain-derived nerve growth factor (BDNF) levels, as well as to the increased phosphorylation of the cyclic AMP response element-binding (CREB) protein. In 2006, a study of sleep in flies investigated the effects of enriched environment exposure on sleep-related gene expression. The researchers found evidence that sleep is increased in flies exposed to socially enriched environment. Most importantly, during sleep these flies showed increased expression of 17 genes related to long-term memory (Ganguly-Fitzgerald et al., 2006). More recently, our research team showed that the mRNA levels of *zif-268* and *arc* are upregulated in the cerebral cortex during late REM sleep episodes (Ribeiro et al., 2007). Taken together, these findings corroborate the notion that sleep harbors active experience-dependent processes related to neural plasticity.

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*. Note that we emphasize this only as a “*possibility of more adaptive behavior on awakening!*” 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. We usually awaken out of more cognitively oriented dreams that are closer to our goal-oriented conscious daytime thinking. We propose that a careful, receptive, and meditative attitude, wherein we support these early morning thoughts that are still close to the new brain plasticity generated during creative REM dreaming, 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.

Rossi (2005) recently outlined how the sustained neuronal reverberation during SW sleep, which is immediately followed by plasticity-related gene expression during REM sleep as reported by Ribeiro et al. (2008), may be an important adaptive process in the reconstruction theory of fear, stress, and traumatic memories and symptoms via psychotherapy and therapeutic hypnosis. 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.” *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.*

The Future Orientation of Constructive Memory

In a recent review (Rossi, Erickson-Klein & Rossi, 2008) we explored the new distinction between the *future, prospective memory system* being investigated in current neuroscience and the *past, retrospective memory system*, which was the original theoretical foundation of therapeutic hypnosis, classical psychoanalysis, and psychotherapy. We generalized Ribeiro’s evolutionary theory of sleep and dreaming, which focuses on the *future, prospective memory system*, to conceptualize a new evolutionary perspective on psychotherapy, therapeutic hypnosis, and rehabilitation.

For 200 years research in hypnosis has explored memory in studies that have focused on preserving and recovering the past. Neuroscientists, by contrast, are now documenting how some brain systems of memory and learning are better oriented to exploring future life possibilities rather than maintaining accurate records of the past. We now know that memories are not exact replicas of the past, and further, such exact records of the past would not be the best strategy for adaptive behavior in the future. They provide evidence for a new constructive theory of how past memories can be reorganized into new scenarios for current and future adaptive behavior (Gaidos, 2008; Schacter et al., 2007; Szpunar et al. 2007). This constructive future orientation to identity and self creation, which was pioneered by Carl Jung (1917/1953), Milton Erickson (1927/2008; Erickson & Rossi, 1973, 1989), and Rossi, (1972/2008; 1973a-c), was recently described as the “memory-prediction framework” in the operation of the six layered human neocortex that accounts for the evolution of intelligence, creativity, and intelligent machines (Hawkins & Blakeslee, 2004). This future orientation of the brain’s *adaptive and constructive memory system*, which is complementary to the *past record keeping function of memory*, is an important focus for facilitating current problem solving in the therapeutic processes outlined in chapters 9, 10, 11, and 12.

Creative Implications

- Dreams can be creative replays of past events that may generate more adaptive futures.
- Sustained neuronal reverberation during SW sleep followed by plasticity-related gene expression during dreaming generates our natural transformations of mind & behavior.
- Gene expression & brain *plasticity* consolidate the reconstruction of fear, stress, and traumatic memories and symptoms via psychotherapy and therapeutic hypnosis.
- The future orientation of the brain’s *constructive memory system* is utilized to facilitate new identity creation and problem solving via the therapeutic processes outlined below.

CHAPTER 6

Mirror Neurons, Empathy, & Conflict: Art, Truth and Beauty via Gene Expression and Brain Plasticity

Recent research in neuroscience has documented the activity of “mirror neurons in primates and humans that function as “a potential neural mechanism for empathy, whereby we understand others by mirroring their brain activity” (Miller, 2005, p. 946). This neural basis of empathy finds support in research on dysfunctions in the mirror systems of humans with autism and fMRI research designed to assess emotional empathy. Such *empathy* research at the *neural* level and *trust* at the *genomic* and *hormonal* levels (Kosfeld et al., 2005) is consistent with descriptions of the “*rapport*” – the sympathetic relationship – between therapist and subject that has been used as an explanatory principal to account for many of the classical phenomena of hypnosis for over 200 years.

It is important to realize how this *multi-level lock of rapport* on at least 4 levels (molecular-genomic, hormonal, neural, and experiential) is a new model for all complex psychosocial experiences whose *subjective* aspect has made them seemingly refractory to *objective* measurement and scientific study in the past. This understanding of rapport is entirely consistent with our neuroscience world view, which outlines how *the functional concordance of co-expressed families of genes as measured by DNA microarrays* could become a new scientific approach to quantifying the varying subjective states of consciousness, creativity, and private implicit processing during psychotherapy, therapeutic hypnosis, and rehabilitation (Rossi, 2007).

The history of hypnosis beginning with Mesmer is rich in accounts of the special efficacy of therapeutic hypnosis when experienced in groups and demonstrations of stage hypnosis where people mirror, mimic, and role-play each others behavior (Tinterow, 1970). Erickson describes how he can determine whether a person will be a good hypnotic subject by assessing their natural “*response or behavioral attentiveness*” in an initial interview (Erickson, Haley, & Weakland, 1959). Research is now needed to determine the degree such response *attentiveness* actually reflects the activity of mirror neurons in everyday life as well as on our standardized hypnotic susceptibility scales. We speculate that Erickson use “pantomime techniques” is probably mediated by mirror neurons. Erickson would sometimes surround a “resistant” subject with highly suggestible subjects to induce hypnosis; we now recognize this as a utilization of the simple “monkey see, monkey do” principle of mirror neurons. It is now intimated that “the study of the brain’s mirror systems will do for psychology what the study of DNA has done for biology” (Miller, 2005 p. 945). From this new neuroscience perspective we

can understand the psychosocial interactions between therapist, subject, and groups in psychotherapy and therapeutic hypnosis as mutually empathetic entrainments at the levels of gene expression, brain plasticity, and mirror neurons.

We can now understand how a subject's ability to "think and feel along with" the therapist's words, metaphors, stories, and implicit processing heuristics in psychotherapy and therapeutic hypnosis could be a measure of "hypnotic susceptibility" via the activity of mirror neurons. Likewise, the *actions* of story tellers, singers, dancers, orators, actors, and politicians of all sorts to "move" an audience are actually *implicit processing heuristics* that evoke gene expression and brain plasticity. All deeply meaningful psychosocial interactions between people – friends, couples, families, special interest groups, communities, and nations – are using implicit processing heuristics to engage and mutually entrain each other at the levels of gene expression and brain plasticity via mirror neurons. We can now better appreciate how the outer destructive events of war and social chaos can traumatize and stress individuals to loosen the psychosocial fabric at the fundamental levels of gene expression, brain plasticity and mind-body health.

We propose that neuroscience research on mirror neurons is providing a new empirical foundation for exploring the fundamental processes of *empathy* in psychotherapy, *transference* in psychoanalysis, and *rappport* in therapeutic hypnosis. Indeed, there is much to suggest that research on mirror neurons will eventually clarify a broad range of human experiences from the dynamics of "unconscious" (Rossi, 2007) to social cognition (Iacoboni, 2008). We believe that optimal functioning of mirror neurons is a fundamental factor in the "talent" of all psychological workers, particularly psychotherapists.

Mirror Neurons, Language Development and Emotional Conflict

Crespi (2007) reports on a new evolutionary perspective of mirror neurons and the human experience of conflict at the genomic level as follows:

The origin of speech and language is arguably the most important transition in the evolution of modern humans... based on the analysis of the evolutionary-genetic and neurological changes that were concomitant to modern human origins. This framework is grounded in the mirror-neuron system of humans and related primates, which provides a well characterized neural substrate (i.e. the same sets of premotor neurons fire when one observes or hears a movement or sound made by another individual as fire when making the movement or sound one's self) for an apparent evolutionary transition in the human lineage from gestures, to gestures with articulations, to articulations that are free of gestures.

Evidence from functional imaging, gene-expression studies, phenotype–genotype associations, and the molecular evolution of FOXP2 implicates this gene in the adaptive

evolution of the mirror neuron system in humans, and in the origin of articulate speech. What can the functional design of FOXP2 and the mirror-neuron system tell us about the selective pressures involved in the origin of human language? ...

The hypothesis that articulate human speech and language evolved at least partially in the context of genomic conflict is also supported by: (i) evidence for imprinting of FOXP1, which interacts with FOXP2 in early brain development; (ii) the role of FOXP2 in ultrasonic vocalizations by young mouse pups, which exhibit complex, interactive characteristics that are indicative of mother– offspring communication; and (iii) linkages of FOXP2 allelic variants to autism and schizophrenia, two disorders of the social and linguistic brain whose development is mediated by the mirror-neuron system and by imprinting effects. (References cited in the original are omitted here.)

Crespi notes that his evolutionary hypothesis provides a novel selective context for a key transition in the origin of modern humans. *It places conflict on the genomic level as a source of neural Darwinism* (Edelman, 1987, 1992). This research literature on genomic level activity within mirror neurons adds another increment of scientific support for our gene expression and brain plasticity model of psychotherapy, therapeutic hypnosis, and rehabilitation presented here. It is also a reminder that human conflicts are an inherent aspect of stage two of the creative process as was illustrated above in figures seven and ten.

A New Theory of Art, Beauty, and Truth in Human Relationships

We speculate that the neuroscience of mirror neurons implies a new theory of art, beauty, and truth illustrated in figure ten (Rossi, 20004b, 2007).

Figure 10 illustrates how the “monkey see, monkey do” principle of mirror neurons builds bridges between the religious psycho-spiritual metaphors of all cultures from mind to gene expression and brain plasticity. Figure 10 presents our speculative world view of psychosocial genomics and mind-body healing in a single glance. *Numinous experiences of art, beauty, and truth are positive experiences precisely because they generate the activity-dependent creative reconstruction of the mind-brain at the molecular-genomic, brain plasticity, and psychosocial levels.* We seek to build bridges between our numinous experiences of art and self creation on all levels from mind to gene as the foundation for a new bioinformatic approach to medicine, psychotherapy, and rehabilitation.

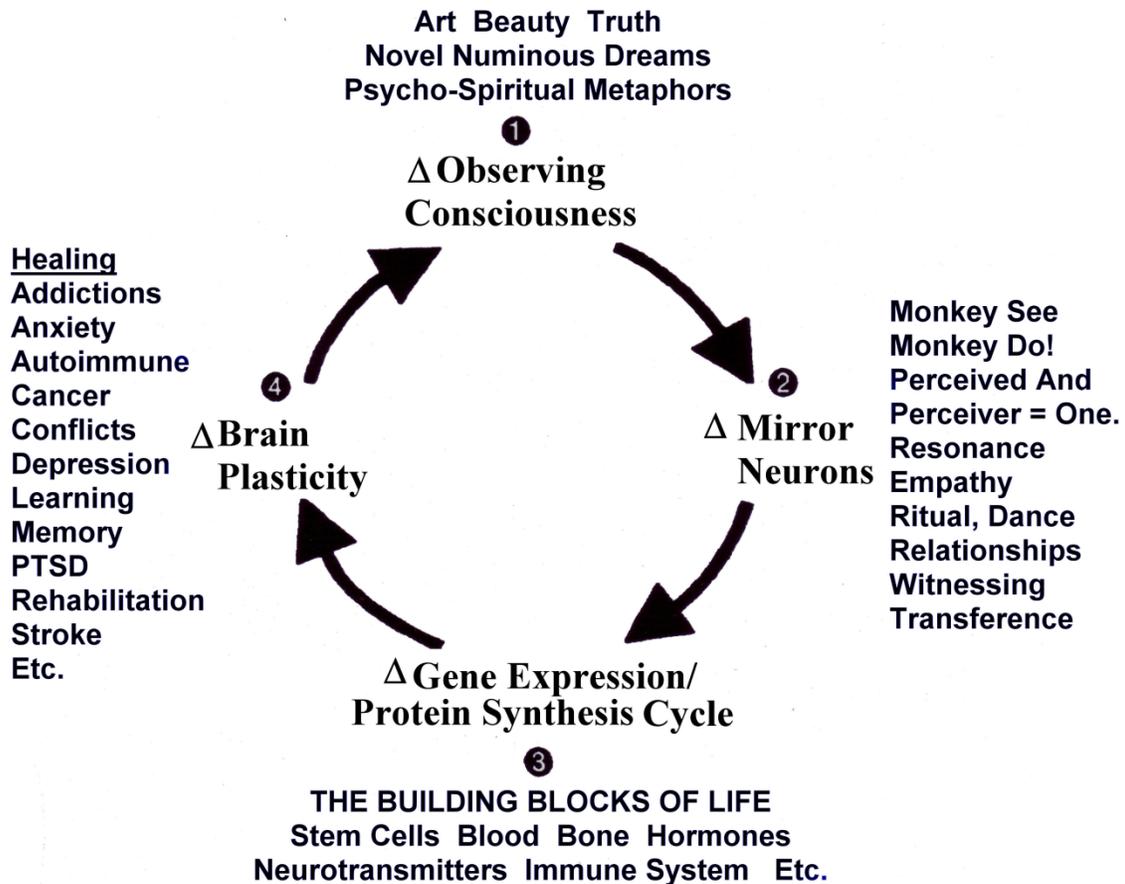


Figure 10: Mirror Neurons in the adaptive dynamics of our new theory of creativity in art, truth, and beauty that is consistent with our neuroscience perspective of psychotherapy and therapeutic hypnosis (Rossi, 2004b, 2007; Rossi & Rossi, 2006). The little delta symbol (triangle) means that a change at any of these four major levels of mind-body information transduction generates a mathematical transformation to the next level in an infinite spiral of never ending developments in human consciousness and experience.

Let us study figure ten carefully to appreciate the profound implications of our integration of the activity-dependent nature of mirror neurons in generating activity-dependent gene expression and brain plasticity during numinous phases of creative consciousness, psychosocial experience, and healing. Notice, in particular, the little delta symbol (triangle) indicating how any change at these four major levels of mind-body can be described by *mathematical transformations to the next level in an infinite spiral of never ending developments in human consciousness and experience*. In the jargon of mathematics these transformations are called, “*differential equations*”. While we do not plan to do the actual math here, it is important to understand the importance of these mathematical transformations because they lead to a practical resolution of the so-called “gap between mind and body” made famous by the philosopher René Descartes (1596 - 1650). We propose that these mathematical transformations are ultimately the most economical descriptions of how the psychosocial therapeutic approaches outlined in this little book could, in the best of circumstances, facilitate our natural patterns of consciousness, communication and healing between mind and gene.

The brilliant physicist, Frank Wilczek (2008), who won the Nobel Prize for research conducted when he was 21 years old, helps us understand such mathematical transformations as the best way of understanding the ultimate nature of reality. In the following quotations it will be helpful to recall that the *activity-dependent aspect of mind* that turns on the *activity-dependent gene expression and brain plasticity is an activity, an “energy,”* that bridges the so-called Cartesian “gap” between the *information of mind* and the *mass* of the body.

“The concept of energy is much more central to modern physics than the concept of mass. This shows up in many ways. It is energy not mass that is truly conserved. It is energy that appears in our traditional equations, such as Boltzmann’s equation for statistical mechanics, Schrödinger’s equation for quantum mechanics, and Einstein’s equation for gravity. Mass appears in a more technical way, as a label or irreducible representations of Poincaré’s group. (I won’t even try to explain that statement – fortunately, just the act of stating it conveys the point.)

“Einstein’s question, therefore lays down a challenge. If we can explain mass in terms of energy, we’ll be improving our description of the world. We’ll need fewer ingredients in our world recipe.” Einstein’s first law is, of course, $\text{Energy} = \text{Mass} \times C^2$. Famously, that first law suggests the possibility of getting large amounts of energy from a small amount of mass. (p. 20)

Wilczek then goes on to explain how the ultimate structures of nature within the nucleus of atoms are quarks and gluons. The following quote is of particular significance for bridging our understanding of mind information as “bits” (“bits” are the smallest binary units of information) and body as physical “its.”

“For quarks and gluons are bits in another and much deeper sense, the sense we use when we speak of bits of information. To an extent that is qualitatively new in science, they are *embodied ideas*. (p. 33, italics in the original!)

“Gluons are the objects that obey the equations of gluons. The its are the bits.” (p. 34)

And there we have it: the ultimate structure of matter or mass in modern physics has dissolved into mathematical transformations of mind, energy, and information within the mirror neurons of our mind. This begs the question: If mathematics has been described as “The Queen of the Sciences,” who would be her consort, “The king of the Sciences?”

The Golden Rule: Mirror Neurons in a New Theory of Ethics

We now propose that mirror neurons play a profound role in a new theory of ethics. Immanuel Kant’s core philosophical principle of ethics is the “Supreme Categorical Imperative.” Most spiritual traditions have described Kant’s supreme categorical imperative as “The Golden Rule: Do unto others as you would have others do unto you.” Here we borrow a page from the history and humor of philosophy by Cathcart and Klein (2007, p. 85-86) that traces the golden rule back to its sources in religion traditions.

HINDUISM (c. 13th Century B.C.)

Do not to others what ye do not wish done to yourself ...
This is the whole Dharma. Heed it well.
—*The Mahabharata*

JUDAISM (c. Thirteenth Century B.C.)

What is hateful to you, do not do to your neighbor:
that is the entire Torah;
the rest is commentary; go learn it.
—*The Babylonian Talmud*

ZOROASTRIANISM (c. Twelfth Century B.C.)

Human nature is good only when it does not do unto
another whatever in not good for its own self.
—*The Dadistan-i-Dinikk*

BUDDHISM (c. Sixth Century B.C.)

Hurt not others in ways that you yourself would find hurtful.
—The Tibetan *Dhammapada*

CONFUCIANISM (c. Sixth Century B.C.)

Do not do to others what you do not want done to yourself.
—Confucius, *Analects*

ISLAM (c. Seventh Century A.D.)

No one of you is a believer until you desire for another that which you desire for yourself.
—“The Sunnah,” from *The Hadith*

BAHÁ'Í (c. Nintheenth Century A.D.)

Ascribe not to any soul that which thou wouldst not have ascribed to thee,
and say not that which thou does not.
This is my command unto thee, do though observe it.
—Bahá'u'alláh, *The Hidden Words*

SOPRANOISM (Twenty-First Century A.D.)

Whack the next guy with the same respect you'd like to be whacked with, you know?
—Tony Soprano, Episode Twelve

We propose that our universal recognition of the value of the golden rule is made possible by the empathetic and ideodynamic activity of our mirror neuron systems. *The ideodynamic action theory of therapeutic hypnosis* has been described as an *idea activating psychodynamics* on all levels from mind to gene expression and brain plasticity (Rossi, 2007, chapter thirteen). The values of the golden rule can be facilitated with ideodynamic therapeutic approaches such as

“The Four Stage Creative Process with Hand Mirroring,” which we outline in later chapters of this book.” These therapeutic approaches are operative on many self-referential levels within both the client and the therapist as well as between them. In the deepest sense psychotherapy is not simply a process whereby the therapist is teaching, directing or suggesting things to the client. In the best of circumstances the mirror neuron systems of both the therapist and client are simultaneously active in empathetic synchrony with each other. This is the golden rule of psychotherapy: *What therapists say to their clients, they are also saying to themselves.* The creative insights, healing, and problem solving via novel experiences of gene expression and brain plasticity are mediated by mutual processes of development and self care within and between the mirror neuron systems of client and therapist.

Creative Implications

- Mirror neurons mediate *empathy* in psychotherapy, *transference* in psychoanalysis, and *rapport* in therapeutic hypnosis.
- Mirror neurons mediate self referential empathic and creative *relationships within and between therapists and clients on all levels from mind to gene.*
- *Numinous experiences of art, beauty, and truth are positive experiences precisely because they generate the activity-dependent creative reconstruction of the mind-brain at the molecular-genomic, brain plasticity, and psychological levels.*
- We seek to build bridges between our numinous experiences of art and self creation on all levels from mind to gene and ethics as the foundation for a new *psychobioinformatic* approach to medicine, psychotherapy, and rehabilitation.

CHAPTER 7

A Musical Interlude

The Sonata Form of The Four Stage Creative Process

Why do we have music? The psychological experience and meaning of music has been under intense scrutiny in recent years (Patel, 2008). In this chapter we propose how music can be an expression of the four stage creative process on all levels from mind to molecule. Music is a clear example of how art, beauty, and truth can be creative experiences facilitating the development and transformations of consciousness and behavior in our daily lives.

Students of music appreciation will note the similarity between the four stage creative cycle profiled earlier in figure seven and the four parts of the classic *sonata form* profiled in figure eleven. The term “*sonata form*” refers to the first movement of a symphony. The opening fast movement of a classical symphony (*sonata-allegro*), for example, is usually in sonata form. The sonata form has 3 main sections (the *exposition*, *development*, and *recapitulation*) that are often followed by a fourth and concluding movement called, “the *coda*.” The sonata form illustrates how composers of the classical period (1750-1820) such as Hayden, Mozart, Beethoven and their followers expressed human *conflict*, *crisis*, and *their resolution* in music for over 200 years (Kamien, 2006).

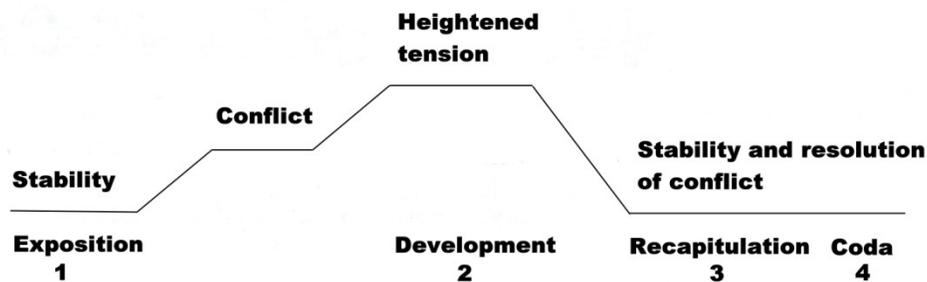


Figure 11: This four-stage outline of the sonata form in classical music illustrates of how the creative arts (dance, drama, music, myth, poetry, song, stories, etcetera) may be understood as performance modalities for the therapeutic replay, reconstruction, and reframing of negative human experiences into positive perspectives that many cultures regard as “healing,” or “therapeutic.” Numinous experiences of art, beauty, and truth are positive experiences precisely because they generate the activity-dependent creative reconstruction of the mind-brain at the molecular-genomic, brain plasticity, and psychological levels (Rossi, 2002a, 2004b; Rossi & Carrer, 2005; Erickson 1958/2007).

How the Sonata Form of Classical Music Portrays The 4-Stage Creative Process

The Sonata Form, which is an approximately 20 to 45 minutes of classical symphony, is usually profiled in 3 or 4 movements. Kamien (2006, p. 163-164) describes the sonata form in the following quotations:

“The amazing durability and vitality of sonata form result from its capacity for drama. The form moves from a stable situation toward conflict (in the exposition), to heightened tension (in the development), and then back to stability and resolution of the conflict.”

This reminds us of the creative process in psychotherapy. We propose that the durability and vitality of the sonata form for over 200 years comes from its integration of creative human experiencing from cognition and emotion to the molecular-genomic.

Stage One: Exposition

“The exposition sets up a strong conflict between the tonic key and the new key. It begins with the first theme in the tonic, or home, key. There follows a bridge, or transition, leading to the second theme, in a new key.”

This first stage of the sonata form corresponds to Stage One of the Creative Process when therapist and patient seek to identify the problem (first theme) and the life changes (second theme) that are at the source of patient’s conflicts of Stage Two.

Stage Two: Development

“The development is often the most dramatic section of the movement. The listener may be kept off balance as the music moves restlessly through several different keys. Through these rapid modulations, the harmonic tension is heightened. In this section, themes are developed, or treated in new ways. They are broken into fragments, or motives, which are short musical ideas developed within the composition. A motive may take on different and unexpected emotional meanings.”

This second part of the sonata form corresponds to Stage Two, the incubation stage of the Creative Process with its characteristic conflicts, negative emotions, and symptoms.

Stage Three: Recapitulation

“The beginning of the recapitulation brings resolution, as we again hear the first theme in the tonic key. . . .Earlier in the exposition, there was a strong contrast between the first theme in the home key and the second theme and closing section in a new key; that tension is resolved in the recapitulation....”

This third section of the sonata form obviously corresponds to Stage Three of the Creative Process when there is an initial resolution of the conflict, problems, and symptoms of Stage Two.

Stage Four: Coda

“An even more powerful feeling is attained by following the recapitulation with yet another section. The coda rounds off a movement by repeating themes or developing them further. It always ends in the tonic [home] key.”

This fourth and final part of the sonata form corresponds to Stage Four of the Creative Process in psychotherapy when the patient returns home to reality test the new problem and symptom solutions found in Stage Three. (All quotations from Kamien, 2006, pp. 163-164.)

The integration of the musical and psychological perspectives of the sonata form was described intriguingly by Sullivan (1927) in his brief and prescient book, *Beethoven: His spiritual development*. In this little book Sullivan proposes a “revelation” theory of art and “higher consciousness” that Beethoven experienced in composing his last string quartets.

“The four-movement sonata form corresponds to a very fundamental and general psychological process, which is the reason it is found so satisfactory and has been so often employed. The general scheme of a first movement, usually representing a conflict of some kind, followed by a meditative or consoling slow movement, and that by a section easing the way to a vigorous final statement, to a conclusion won, is in its main lines, admirably adapted to exhibit an important and recurrent psychological process. The life histories of many major psychological processes can be accommodated within this framework. But in the quartets we are discussing Beethoven’s experience could not be presented in this form. The connection between the various movements is altogether more organic than that of the four-movement sonata form. In these quartets the movements radiate, as it were, from a central experience. They do not represent stages in a journey, each stage being independent and existing in its own right. They represent separate experiences, but the meaning they take on in the quartet is derived from their relation to a dominating, experience. This is characteristic of the mystic vision, to which everything in the world appears unified in the light of one fundamental experience. In these quartets Beethoven is not describing to us a spiritual history; he is presenting to us a vision of life. In each quartet many elements are surveyed, but from one central focus.” (Pp. 153-154, italics added)

“Therefore a work of art may communicate knowledge. It may indeed be a “revelation.” The “higher consciousness” of the great artist is evidenced not only by his capacity for ordering his experience, but also by having his experience. His world may differ from that of the ordinary man as the world of the ordinary man differs from that of a dog in the extent of his contact with reality as well as in his superior organization of it. We may continue to maintain, then, the “revelation” theory of art. Indeed, our business as critics is to make it more explicit. The highest art has a transcendental function, as science has. In saying this, however, we must be careful to distinguish between these functions.” (Pp. 15-16)

The four stages of the sonata form as described by many scholars of classical music (Kamien, 2006; Rosen, 1988, 1997; Sullivan, 1927) and illustrated in figure 11 are a striking examples of how the creative arts may be understood as performance modalities that carry out “*psychological work*” (Haukappe & Bongartz, 1992; Unterwegner, Lamas & Bongartz, 1992). What is this “*psychological work*?” The various forms of artistic expression (cinema, dance, drama, literature, music, myth, poetry, song, stories etc.) are *psychological work* on the implicit (unconscious) levels of the therapeutic replay, reconstruction, and reframing of negative (stressful) human experiences into positive “inner resources” that many cultures have called “healing,” “therapeutic,” or “wisdom.” Numinous experiences of art, beauty, and truth become positive experiences when their initially surprising and unexpected *activation of novelty stress* generates the *activity-dependent* creative reconstruction of the mind-brain at the molecular-genomic, brain plasticity, and psychological levels (Rossi, 2002, 2004a, 2004b, 2005a).

Taken together figures seven and eleven illustrate how the creative arts are performance modalities for the therapeutic replay, reconstruction, and transformation of negative human experiences into positive perspectives. A primary function of culture is to perform “healing,” and “therapeutic,” rituals leading to “social integration” and “wisdom.” It is the deep psychobiological arousal of stress, struggle, and conflict during stages one and two of the creative process that generates the *activity-dependent* creative reconstruction of the mind-brain on the molecular-genomic and brain plasticity levels that are experienced as joyful and positive in new stages three and four. Numinous experiences of art, beauty, and truth are positive experiences of stage three and four of the creative process that are experienced after the difficult stress and labor of stages one and two. *Art, beauty, and truth are creative experiences on the psychological level that correspond to gene expression and brain plasticity on the molecular and neural levels in the brain, particularly during stage three of the creative cycle.* The following chapters outline a few creative processes we have developed to facilitate psychological development in psychotherapy.

Creative Implications

- The psychological experience and meaning of music can be an expression of the four stage creative process on all levels from mind to molecule.
- Composers of the classical period (1750-1820) such as Hayden, Mozart and Beethoven expressed human *conflict, crisis, and their resolution* in the 4-stage creative process of the “sonata form.”
- Music that evokes the deep psychobiological arousal of stress, struggle, and conflict during stages one and two of the creative process may facilitate the *activity-dependent* creative reconstruction of the mind-brain on the molecular-genomic and brain plasticity levels that are experienced as joyful and positive in new stages three and four.

Future research is required to assess whether music and the other arts can facilitate a revelation of higher consciousness that could optimize gene expression and brain plasticity.

CHAPTER 8

Four-Stage Creative Psychotherapy: Constructing Future Mind

The four-stage creative process in psychotherapy has a long history. It has its sources in the dreams and myths of the ages as well as recent approaches to research on the creative process, psychotherapy and therapeutic hypnosis (Rossi, 1972/2000). Leonardo da Vinci originally described seven characteristics of the creative process: *Curiosità—Dimostrazione—Sensazione—Sfumato—Arte/Scienza—Corporalità—Connessione*. Centuries of introspection by creative workers, as well as research in psychology and modern neuroscience, has simplified and condensed these 7 characteristics into a Four-stage Creative Process that is easy for most people to learn in facilitating their constructive mind (Rossi, 2002a, 2004a; Sandkühler & Bhattacharya, 2008).

Integration of Leonardo da Vinci's Seven principles of the Creative Process with Modern Neuroscience

Stage 1: Preparation, Data Gathering: “curiosita” and “sensazione”

It is now known that any intense psychological states of arousal—such as *trauma*, pain, stress, novelty, dreaming (REM sleep), and creative moments in everyday life as well as the arts and sciences can initiate the activity of Immediate Early Genes, *Activity (Experience) Dependent*, and Behaviour-State Related Genes in our brain and body. Our genes are not always in an active state; genes have to be stimulated *in everyday life by internal and external environmental and psychosocial factors to generate* the proteins that are the molecular machines of life that do creative work. Stage one of the creative process includes Leonardo da Vinci's principles of *curiosita* and *sensazione*. Sensations stimulate neural activity and curiosity, the desire to learn more, sets us forth on deeply motivating outer and inner journeys of discovery and self-creation.

Stage Two: Incubation: “dimostrazione” and “sfumato”

In his teaching demonstrations of psychotherapy for students and professionals Rossi *hypothesizes* how Immediate Early, Activity Dependent and Behaviour State-Related Gene Expression *may be taking* place during creative problem solving. Often the incubation stage is characterized by a mild state of confusion, stress and even psychosomatic symptoms. This stage often corresponds to Leonardo's principle of *dimostrazione*. We have to discover for ourselves what we believe in. We need to look at things from different perspectives and to learn from our mistakes. Leonardo's principle of *sfumato* has a gradation of meanings from the literal translation of smoke gradually thinning out, to soft, shaded, and, the more popularly expressed,

“come to nothing” – *to progress or “go up in smoke.”* The concept of *sfumato* characterizes the often difficult transition from stage two to stage three of the creative process.

Stage Three: Illumination: “arte/scienza, corporalita, and conessione”

This is the very rewarding creative moment experienced in the arts and sciences as well as psychotherapy. This stage is the initial experience of what Leonardo describes as *arte/scienza, corporalita, and conessione*. We hypothesize that gene expression and new protein synthesis at this *numinous* stage may generate brain plasticity – the actual synthesis of new synapses and connections between brain cells that encode human experience and the creative transformations of consciousness. It is of essence that people learn how to recognize and support these new developments in their consciousness and the construction of their better future mind! The main job of the psychotherapist at this stage is to help people recognize and appreciate the *new*. Often a person’s psychosomatic symptoms disappear dramatically as personal problems are resolved with the new perspectives that develop.

Stage Four: Verification: Supporting the “New Reality”

In this final stage of the creative cycle the person must evaluate and verify the value of the new experiences of stage three by practicing them in real world. The new experiences and realizations are often fragile and can be easily lost in smoke – Leonardo’s precious *arte/scienza, corporalita, and conessione* can be lost in *sfumato* again! It is ironic that our family and friends, who wish us well, often do not recognize the new that develops within us. Because they do not recognize the potential value of the new, the people who are closest to us often do not know how to support us in the realization of our new reality. Thus adolescents have difficulties with their family and friends. Falling in love can be fragile and fickle. Innovators and creative worker have been perpetually misunderstood and persecuted throughout history for daring to assert their new consciousness.

The approaches we outline in this and the following chapters are integrations of the theory and practice of many schools of psychotherapy including Carl Jung’s synthetic or constructive method (Rossi, 2008) and variations of Erickson’s hand levitation approach to therapeutic hypnosis (Erickson, Rossi, Erickson-Klein & Rossi, 2008). They are all consistent with neuroscience research on activity-dependent gene expression and brain plasticity as the neuro-psycho-physiological basis of the four-stage creative process in psychotherapy, which we now outline. Research is now required on these therapeutic approaches to meet the criteria of evidence based medicine on all levels from mind to gene (Rossi. 2005/2006; Rossi et al. 2006a).

Psychotherapist's guide for the Four Stage Creative Process

Stage One: Initiation – The Recognition of a Problem - Symptom Scaling & Privacy

A natural approach to activity-dependent creative work begins with the typical history taking in brief psychotherapy. More than mere words are involved. The typical tears and distress in an initial interview indicate that people are already accessing state dependent memory and emotional arousal that signals they are embarking on a potentially healing adventure. The therapist's main job here is to recognize that therapy has already begun and simply facilitate it. Basic Accessing Questions (Implicit Processing Heuristics) can optimize the client's inner work without the therapist even knowing what the problem is. The therapist may begin by the Symptom Scaling of the patient's current emotional state. A 1 to 10 scale (10 being the worst, 5 average and zero a satisfactory state) may be used to assess and validate inner work before and after every psychotherapeutic process.

Stage Two: Incubation - Dark Night of the Soul, Current Experience

This is the valley of shadow and doubt, or “the storm before the light” that is portrayed in the poetry and song of many cultures. Emotional conflicts and symptoms that come up are the mind-body language about unresolved problems at an unconscious level that require review and reconstruction. *The therapist's main job is to: 1. Offer open-ended therapeutic questions (Implicit Processing Heuristics) designed to access the state-dependent memory encoding symptoms and; 2. Support the signs of arousal that are typical of creativity and problem solving. Less is often more at this stage, respectful listening rather than giving advice.*

Stage Three: Illumination – “Aha” Experience, Constructing Future Mind

This stage is characteristic of the famous “Aha” or “Eureka” experience celebrated in ancient and modern literature when the creative process is described in the arts and sciences. Some people smile and seem surprised when they receive an unexpected and creative thought. Many patients habitually dismiss their own originality as worthless since it has never been supported in their early life. *The therapist's main job at this stage is to help the person recognize and appreciate the value of the “new” that seems to emerge spontaneously and unheralded. Often the subject may have already thought of the options that come up for problem solving at this stage, but dismissed them rather than reality testing them.*

Stage Four: Verification – Evaluation & Reality Testing

What current life changes does the client want to put into their life as a result of this therapy? *The therapist's job here is to: 1. Facilitate a follow-up discussion to validate their constructive therapeutic process and; 2. Reframe Symptoms into Signals and Psychological Problems into Inner Resource for more adaptive and creative behavior. The symptom scaling of the subject's state of being before and after the psychotherapy is actually a validation of progress, problem solving and healing.*

In the following chapters we will outline some easy-to-learn approaches to activity-dependent psychotherapy that applicable to a wide range of human problems (Rossi, 2002a, 2004a).

Constructing Future Mind and the Psychobiological Foundations of Meta Math

Our focus on the creative and constructive aspects of the mind-brain via gene expression and brain plasticity has been re-discovered recently in the new foundations of “Meta Math.” What is Meta Math? Gregory Chaitan (2005) is a brilliant mathematician who has described his own creative process in discovering the biological foundations of information theory and mathematics, which he calls, “Meta Math!” We will add our descriptions of the four stages of his creative process in square brackets as he outlines his story of discovery in his own words.

My Love/Hate Relationship with Gödel’s Proof

“And then one day I discovered that little book that had just been published. It was by Nagel and Newman, and it was called *Gödel’s Proof*. This was in 1958, and the book was an expanded version of an article that I’d also seen, and that was published by the two of them in *Scientific American* in 1956. It was love at first sight! Mad love, crazy love, obsessive love, what the French call *amour à la folie*. Here in fact was a possible explanation for the difficulties that mathematicians were experiencing with the primes: Gödel’s incompleteness theorem, which asserts that any finite system of mathematical axioms, any mathematical theory is **incomplete**. More precisely, he showed that there will always be arithmetic assertions, assertions about the positive integers and addition and multiplication, what are called number-theoretic assertions, which are true but improvable.

“I carried this book around with me constantly, absolutely and totally fascinated, mesmerized by the whole idea. [Engaged by the numinosum associated with gene expression and Brain Plasticity.] There was only one small, tiny little problem [**Stage One: “Initiation”—Recognizing a Problem**], fortunately, which was that for the life of me I couldn’t understand Gödel’s proof of this wonderful meta-mathematical result. It’s called that because it’s not a mathematical result, it’s a theorem **about** mathematics itself, about the limitations of mathematical methods. It’s not a result within any field of mathematics; it stands outside looking down at mathematics, which is itself a field called meta-mathematics!

“I wasn’t an idiot, so why couldn’t I understand Gödel’s proof? Well, I could follow it step by step, but it was like trying to mix oil and water. My mind kept resisting. [**Stage Two: “Incubation”— The Dark Night of the Soul**] ...

“Let me explain what happened better; I’ll now reveal to you one of the secrets of mathematical creation! I loved incompleteness, but not Gödel’s proof. Why?

Because of the lack of balance between the ends and the means, between the theorem and its proof. Such a deep and important—philosophically important—mathematical result deserved a deep proof that would give deep insight into the “why” of incompleteness, instead of a clever proof that only permitted you to have a superficial understanding of what was going on. This was my feeling, totally on intuitive grounds, pure instinct, pure intuition, my subconscious, gut-level, emotional reaction to Gödel’s proof.

And so I set to work to make it happen! This was a totally subjective act of creation, because I **forced** it to happen. How? Well, by changing the rules of the game, by reformulating the problem, by redefining the context in which the incompleteness was discussed in such a way that there would **be** a deep reason for incompleteness, in such a way that a deeper reason for incompleteness could emerge! [**Period of Private Inner Work and Creative Replay.**]

You see, within the context that Gödel worked, he had done the best that was possible. If you were to keep the set up exactly the same as the one he had dealt with, there **was no** deeper reason for incompleteness. And so I proceeded to change the question until I could get out a deep reason for incompleteness. My instinct was that the original context in which the problem of incompleteness was formulated had to be changed to one that permitted such deeper understanding— that it was the wrong context if this wasn't possible! [**A Self Administered Therapeutic Reframe by changing the context!**]

Now you see why I say the mathematician is a creator as much as a discoverer and why I say that mathematical creation is a totally personal act. ...

I think that both views of this particular act of creation are correct: On the one hand, there was a *masculine* component, in making something happen by ignoring the community consensus of how to think about the problem. On the other hand, there was a *feminine* component, in allowing my hypersensitive intuition to sense a delicate new truth that no one else was receptive to, that no one else was listening for.

The purpose of this book is to explain what I created/discovered to you. It took many years of work, culminating with the halting probability Ω — sometimes called Chaitin’s number— that’s the discovery that I’m most proud of. [**Stage three: Illumination – The "Aha" Experience.**] ... (p. 26-29)

What is Biological Information?

Here is a specific example that is of great interest to us as human beings. Our genetic information (DNA) is written using an alphabet of four symbols:

A, C, G, T

These are symbols for each of the possible bases at each rung of a DNA double-helix. So each of these bases is exactly 2 bits of information, since two bits enable us to specify exactly $2 \times 2 = 4$ possibilities. ...

That's the story, roughly speaking, but DNA is actually much more sophisticated than that. For example, some proteins turn other genes on and off; in other words, they control "expression." We are dealing here with a programming language that can perform complicated calculations and run through sophisticated sequences of gene expression in response to changes in environmental conditions! [**Stage Four: "Verification" – Evaluation and Reality Testing.**]

And as I said before, the DNA software of some of our cousin apes and other near-relative mammals is surprisingly similar to our own. DNA subroutines are strongly "conserved"; they are reused constantly across many different species. Many of our basic subroutines are present in much more primitive living beings. They haven't changed much; nature likes to reuse good ideas. (p. 74-75)

*We now need to take but one further step to fully grasp the deeper implications of Chaitin's "Love/Hate Relationship" with Gödel's Proof of the incompleteness of all formal axiomatic systems in the foundations of meta math. Chaitin recognizes the importance of gene expression in biological information but he does not mention how gene expression generates the brain plasticity – the actual growth of the new neural networks of the brain – that is associated with the creative expansion in awareness and consciousness that is needed to complete any formal axiomatic system. All static formal axiomatic systems at the foundations of mathematics are either incomplete or inconsistent because they invariably fall into the paradoxes of logic that Gödel's Proof was supposed to transcend in the first place. In the final analysis they will forever be either incomplete or inconsistent (in conflict) because they are always at least one step behind the ongoing life process of gene expression and brain plasticity that is *Breaking Out of yesterday's static formal axiomatic systems* (Rossi, 1972/1986/2000, 2007). The creativity of the mind-brain is perpetually outgrowing itself in an infinite spiral of evolving consciousness.*

This is a wonderful invention of the creative human mind-brain because it is highly adaptable in the struggle for existence. However there is a price to be paid: *the inevitability of conflict in stage two of the creative process!* All is not sweetness and light in the struggle for art, beauty, and truth. The spontaneous growth of the human mind-brain via gene expression and brain plasticity means that changes are always being made – something new is always being generated – particularly during our sleep and dreams when we have been confronted with new and challenging circumstances the day before.

The mind-brain is not a *static* formal axiomatic system. To cope creatively and effectively life generates the numinous new—we are always a different person when we awaken every morning. The potentially adaptive value of the new that is generated within, however, can be

the source of conflict, difficulty, and stress when it is *incomplete or inconsistent* with our previous beliefs and world view. Does this sound familiar? Yes, the so-called cares and stresses of normal everyday psychology are the same problems of *incompleteness or inconsistency* that reside in foundations of meta-mathematics. What is true for the meta-mathematical *foundations of all static formal axiomatic systems is also true when we are stuck in stage two of the creative process during the trials and tribulations of ordinary thinking, feeling, and behavior in everyday life.*

The next four chapters will outline a series of four easy-to-learn therapeutic approaches to facilitating the four stage creative process with the dramatic hand mirroring style that tends to make visible some aspects of the usually hidden and unconscious essence of problem solving and healing. What our clients project into 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. In psychotherapy we aspire to create a psychosocial temnos wherein therapist and client's mirror neurons are mutually engaged in a permissive symphony synchronizing caring, compassionate, and creative attitudes toward their inner work. To celebrate Milton H. Erickson's spirit we would enjoin you to study your clients carefully as they go through these observable experiences of discovery! Your clients will teach you many more sui generis movements (self-generating) and psychodynamics dynamics that you can use to extend our approaches to facilitate the creative processes of others, each in their own unique way!

Creative Implications

- Stage 1: Recognize that therapy has already begun with the patient's personal narration of their issues and simply facilitate them with empathy.
- Stage 2: Explore open-ended therapeutic questions (implicit processing heuristics) designed to access numinous issues and emotional arousal typical of creativity and problem solving.
- Stage 3: Recognize, appreciate, and support the value of the "new" that seems to emerge spontaneously.
- Stage 4: Validate the value of new experiences; *Reframe Symptoms into Signals* and *Psychological Problems into Inner Resources* for constructing a more adaptive and creative future.

CHAPTER 9

Therapeutic Process #1

The Four Stage Creative Process with Hand Mirroring

The 4-stage creative process, as presented here, is an activity-dependent process to access, replay, and re-synthesize memory, learning and behavioral systems that encode significant life experiences. This *4-stage creative process with hand mirroring* utilizes recent research on mirror neurons on the dynamics of human development, empathy, language, and self-creation (Rossi, Erickson-Klein & Rossi, 2008). It can open possibilities for creatively replaying early life experiences, reframing them in an appropriate manner, and integrating them in a more adaptively with real life here-and-now situations. Each processes is a unique never to be exactly replicated life experience even when an attempt is made to standardize the therapist's manner, verbalizations, and implicit processing heuristics.

Implicit Processing Heuristics

We never an attempt to program, prescribe or condition people in a predictable, behaviorist manner. *Rather, we use implicit processing heuristics to engage creative processes whose outcome cannot be predicted in advance.* In the initial preparation stage, for example, it is of no concern whether the person actually experiences any of the sensations that are offered as implicit processing heuristics (e.g. Is one of your hands warmer or cooler than the other?). The intent of the preparation stage is simply to focus the subject inward with heightened self-sensitivity and conscious awareness. There are automatic and implicit, complex adaptive systems operating within the person that continually evaluate, respond to, and modulate what the therapist is saying. The therapist's words are merely *heuristics* — not suggestions, programming, directives, covert demands, commands or interpretations in the conventional sense. Implicit processing heuristics help us to create new solutions for resolve personal problems with our own inner resources. For quantitative research purposes it's a good idea to begin and end the process with a simple subjective scaling of the intensity of the problem by the subject. This tends to build a positive expectancy about the process and also helps the subject evaluate the worth of their own inner creative work.

	<p>1. Stage One: Initiation & Creative Expectation</p> <p>Scale Initial Experience of Problem (0 is Best 10 is Worst) ____.</p> <p>Place your hands up facing each other about 6 inches apart [Therapist demonstrates]. With great sensitivity notice what you begin to experience... Hands feel the same or different?... One lighter or heavier?...Warmer or cooler?... A magnetic force or energy pulling those hands together or apart?... A life of their own seeming to move by themselves?</p>
	<p>2. Stage Two: Incubation, Access Current Experience</p> <p>Will just one hand drift down slowly while you review some private memories related to your problem?... Courage to wonder and receive all that is needed to help you?... One part of you experiencing that as fully as you want to... while another part guides you safely.</p>
	<p>3. Stage Three: Illumination, Aha! Constructing Future Mind</p> <p>Will the other hand now drift down slowly as you explore possibilities of healing and problem solving?...Something new?... Interesting?...Surprising?... What you really need for healing. Explore sources of strength and success as that hand finally comes to rest.</p>
	<p>4. Stage Four: Evaluation, Planning, & Reality Testing</p> <p>When your inner mind knows you can continue these positive developments and when you can enjoy taking a break several times a day to review and strengthen your progress... What will it feel like to come back to a full awakening? [Review the entire session by <i>Reframing Symptoms into Signals and Problems into Inner Resources for Self Care.</i>]</p>

	<p>Stage Four Addendum</p> <p>More Creative Replays if Necessary: On a scale of 0 to 10, <i>how confident are you of your progress?</i> _____. [If a number less than 7 is reported, continue with] “If your inner nature knows it can do another unit of inner therapeutic work right now so you can reach a more completely satisfactory state, will those eyes close for a few moments so you can fully receive everything you need at this time?”</p> <p>End Experience of Problem: Score (0 is Best 10 is Worst) ____.</p>
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Figures 12 a-d are typical illustrations of the Four Stage Creative Process with Hand Mirroring and the therapist’s verbalization accompanying them. While this therapeutic process is highly structured as presented here, everyone experiences them differently and an understanding of their significance is always co-creative art and healing dialogue between the patient and therapist.

CHAPTER 10

Therapeutic Process #2

The Psychotherapeutic Facilitation of Clarity and Strength

This is a very simple and easy-to-learn creative process for facilitating a rapid therapeutic response in people who are overwhelmed by events and obviously experiencing post-traumatic stress right here and now. It offers immediate help for people learning how to use their observing consciousness to experience a mild and temporary “therapeutic dissociation” from the disabling tension of their emotions so they can initiate the creative replay of the emotional conflicts within themselves. It serves as a bridge between implicit (unconscious) and explicit (conscious) experiences, whereby many people can learn to access and facilitate the Four-stage creative process safely in psychotherapy.

Spiritual Inspirations: The biggest Buddha in the World

Rossi originally believed he had invented this hand mirroring process in the early 1980s as a simpler variation of David Cheek’s ideomotor finger signaling approach to resolving problems with therapeutic hypnosis (Rossi, 2002a; Rossi & Cheek, 1988). He saw the truth, however, when he visited the Po Lin Monastery on the Ngong Ping Plateau on the island of Lantau, near Hong Kong a number of years ago. Rossi was astonished when he first gazed upon a statue of the Buddha several stories high meditating in what he had been calling the “fear-not” hand process. He was deeply impressed with the ancient approaches to spiritual processes that we today call “psychotherapy.” The wise therapist utilizes the patient’s own language and worldview to initiate and facilitate this approach to the dramatic experience of “activity-dependent problems solving.” A casual and very general approach is illustrated here.

	<p>1. Initiation and Induction Scale Initial Experience of Problem (0 is Best 10 is Worst) ____.</p> <p>One hand pushing away what you don’t want and the other receiving what you really do want! [Therapist demonstrates] Notice what you begin to experience? One side lighter or heavier? Warmer or cooler? Stronger or weaker?</p>
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	<p>2. Incubation, Access Current Experience Reviewing memories of you don't want. Feel your struggle over the years. Feel the courage to reject what is not right for you! One part of you pushing away the worst of what is wrong! Another part safely and wisely guides you.</p>
	<p>3. Illumination, "Aha!" Constructing Future Mind Welcome and be clear about what you need! Focus strength on the hand that explores possibilities of receiving, healing and problem solving! Curious? Something new? Interesting? Surprising? Receiving Sources of Strength and Clarity!</p>
	<p>4. Verification, Evaluation & Reality Testing [Review the entire session: Reframing symptoms and problems into signals of the positive inner work to heal yourself and develop further]. When something within you knows you can continue these positive developments and when you really know you can take-a-break for about 20 minutes several times a day to transform Symptoms into Signals and Problems into Resources... Will those eyes close [open] for another minute or so to confirm your inner resolve?</p> <p>Creative Replays if Necessary: On a scale of 0 to 10, how confident are you of your progress? _____. [If a number less than 7 is reported, continue with] If your inner nature knows it can do another unit of healing right now so you can reach a completely satisfactory state, will those eyes close for a few moments so you can fully receive everything you need at this time? You know that your mind and body go through a natural 90-minute cycle of ultradian healing and problem solving throughout the day and even at night when you are dreaming. Notice how your progress continues all by itself and we will pick it up from there the next time we meet.</p> <p>End Experience of Problem: Score (0 is Best 10 is Worst) _____.</p>

Figures 13 a-d present a variation in the associations, verbalizations, and possible spiritual significance, which some people and cultures could attribute to this process of Brief Therapeutic Focusing for Clarity and Strength. This illustrates how we are always respectful of individual attitudes and cultural differences in utilizing these therapeutic procedures.

CHAPTER 11

Therapeutic Process #3

Facilitating Consciousness and Creativity by Integrating the Opposites

Sanskrit Philosophical Roots of the Opposites: Dvandva

Coping creatively with the “problem of the opposites” is a central issue in facilitating the evolution of consciousness, developmental psychology, and psychotherapy. The problem of the opposites was traced to its deepest roots in Sanskrit, philosophy, and spiritual systems by Carl Jung (1971) as illustrated in the following quotations:

The Sanskrit term for pairs of opposites in the psychological sense is dvandva. It also means pair (particularly man and woman), strife, quarrel, combat, doubt. The pairs of opposites were ordained by the world-creator... Not to allow oneself to be influenced by the pairs of opposites, but to be nirdvandva (free, untouched by the opposites), to raise oneself above them, is an essentially ethical task, because deliverance from the opposites leads to redemption. (p. 195)

The Indian purpose is therefore clear: it wants to free the individual altogether from the opposites inherent in human nature, so that he can attain a new life in Brahman, which is the state of redemption and at the same time God. (p. 197)

Since suffering is an affect, release from affects means deliverance. Deliverance from the flux of affects, from the tension of the opposites, is synonymous with the way of redemption that gradually leads to Brahman. Brahman is thus not only a state but also a process, a duree creatrice. (p. 199)

The yogi seeks to induce this concentration or accumulation of libido by systematically withdrawing attention (libido) both from external objects and from interior psychic states, in a word, from the opposites. The elimination of sense-perception and the blotting out of conscious contents enforce a lowering of consciousness (as in hypnosis) and an activation of the contents of the unconscious, i.e., the primordial images, which because of their universality and immense antiquity, possess a cosmic and superhuman character. This accounts for all those sun, fire, flame, wind, breath similes that from

time immemorial have been symbols of procreation and creative power that moves the world. (p. 202, italics added)

The Art of Psychotherapy: Perception, Action and Cognition

It is certainly an intuitive art to facilitate such a creative experience in the modern consultation room. Traditionally in psychoanalysis and therapeutic hypnosis the person is encouraged to use their imagination and “trust their unconscious.” From our current neuroscience perspective we purpose that such inner creative work (illustrated above in figure seven) of the “unconscious” or “implicit mind” is in great part mediated by the activity of the mirror neurons systems of both the therapist and the patient interacting with each other. This is the current neuroscience perspective on what has been called the “transference” in psychoanalysis, the “rapport” in therapeutic hypnosis, and “empathy” in ordinary human relationships. Iacoboni (2008) has noted how research in mirror neurons documents that recordings of the activation of single mirror neurons in the brain can simultaneously integrate the three major psychological functions of *perception, action and cognition*. Further research is now needed to clarify how such activation of our mirror neuron systems can facilitate the resolution of emotional issues and the re-construction of the self by the creative process of integrating the opposites as outlined here (Rossi, 1972/2000, 2002a, 2004a,2008; Rossi & Rossi, 1996, 2006).

Problem Solving by Integrating the Opposites

	<p>1. Initiation and Induction Initial Conflict Score (0 is best...10 is worst) _____.</p> <p>Creative work on your issue begins with your hands palms up to receive something important. [Therapist demonstrates with hands free to move!] As you focus with sensitivity tell me know which hand seems to express that problem. The therapist supports the person’s experience with a comment, “Wonderful!”</p>
	<p>2. Incubation, Access Current Experience Feel the <i>opposite of that problem</i> in your other hand... Allow yourself to feel both sides of the problem at the same time!... Let both hands to move, more or less, all by themselves to express your feelings... Express an inner drama about what is going on inside you... Is that going well? Sometimes darkness, storm and struggle before the light?</p>

	<p>3. Illumination, “Aha!” Constructing Future Mind Exploring...Receiving...Surprising? Is it possible to receive what you really need?... One way or another?... Courage to pull it together to get what you want [As subject smiles or makes more positive facial gestures and body language] support with “Good, Really appreciating that”!</p>
	<p>4. Verification, Evaluation & Reality Testing [Review the entire session: Reframing symptoms and problems into signals of the positive inner work to heal yourself and develop further]. When something within you knows you can continue these positive developments, and When you know you can take-a-break for about 20 minutes several times a day to transform Symptoms into Signals and Problems into Resources... Will those eyes close [open] for another minute or so to confirm your inner resolve before you become awake? Creative Replays is sometimes Necessary: On a scale of 0 to 10, how confident are you of your progress?_____. [If a number less than 7 is reported, continue with] If your inner nature knows it can do another unit of healing right now so you can reach a completely satisfactory state, will those eyes close for a few moments so you can fully receive everything you need at this time? You know that your mind and body go through a natural 90-minute cycle of ultradian healing and problem solving throughout the day and even at night when you are dreaming. Notice how your progress continues all by itself and we will pick it up from there the next time we meet. End Experience of Problem: Score (0 is Best 10 is Worst) _____.</p>

Figures 14 a-d present an open-ended approach to Brief Problem Solving by Integrating the Opposites or conflicting dynamics that are typically experienced in stage two of the creative process of problem solving and mind-body healing. Note that much of this inner therapeutic process may be carried out entirely privately within the patient. Sharing what is being experienced is always welcomed by the therapist but is not absolutely necessary as in the theory and practice of classical psychoanalysis and most schools of psychotherapy.

CHAPTER 12

Therapeutic Process #4

The Merry Symptom Chase For Mind-Body Healing

We wrote a book in 1996 titled, *The Symptom Path to Enlightenment: The New Dynamics of Self-Organization in Hypnotherapy* (Rossi & Rossi, 1996) about our fascination with the symptom chase in psychotherapy. How often does a physical symptom appear, and is soon morphed into a different physical symptom? We wanted creative ways to help transform symptoms into signals that move the client to greater health.

While the previous three highly structured activity-dependent approaches to psychotherapy and therapeutic hypnosis are appropriate for students and professionals in mental health on many levels, the following clinical approach is unstructured and requires more extensive professional training in psychodynamics and psychosomatic medicine. Because it deals with medical symptoms it is considered to be an advanced approach that should be conducted only with adequate medical supervision. A demonstration by the senior author on the videotape, "A sensitive fail-safe approach to therapeutic hypnosis" (IC-92-D-V8) is available to professionals from the Milton H. Erickson Foundation: Office@erickson-foundation.org; www.erickson-foundation.org. Chapters seven and eight of *The Psychobiology of Gene Expression* (Rossi, 2002a) are a verbatim transcript and psychodynamic analysis of this entire videotape.

Transforming Symptoms into Signals for Healing



Initial Symptom Score (0 is best...10 is worst) _____.

1. Initiation

Honestly receive what your feeling so you can fully experience what comes next all by itself?... [Accepting whatever symptom, sensory, emotional shifts or doubts are expressed]. Good, noticing what comes next! [The merry symptom chase continues with the therapist's humorous approval of each shift of sensations, feelings, or location of the symptom with a happy expectation of another creative change to come momentarily.]

	<h3>2. Incubation, Access Current Experience</h3> <p>Yes, the courage to experience whatever comes naturally so you can get body messages. ... Exploring private...even secret emotions and memories?... Welcoming what comes next... <i>One part of you experiencing this deeply... While another part of you safely guides you from within.</i></p>
	<h3>3. Illumination, Constructing Future Mind</h3> <p>Allowing that to continue, more or less, all by itself. Exploring?... Receiving?... Surprising?... And is that really possible?... Really receive that! [as subject smiles or makes more positive facial gestures and body language]... Very fine!... Appreciating the best of that!</p>
	<h3>4. Verification, Evaluating and Reality Testing</h3> <p>[Review the entire session: Reframing symptoms and problems into signals of the positive inner work to heal yourself and develop further]. When something within you knows you can continue these positive developments and When you know you can take-a-break for about 20 minutes several times a day to transform Symptoms into Signals and Problems into Resources... Will those eyes close for another minute or so to confirm your inner resolve before you awaken fully?</p> <p>Creative Replays if Necessary: On a scale of 0 to 10, how confident are you of your progress?_____. [If a number less than 7 is reported, continue with] If your inner nature knows it can do another unit of healing right now so you can reach a completely satisfactory state, will those eyes close for a few moments so you can fully receive everything you need at this time?</p> <p>You know that your mind and body go through a natural 90-minute cycle of ultradian healing and problem solving throughout the day and even at night when you are dreaming. Notice how your progress continues all by itself and we will pick it up from there the next time we meet.</p> <p>End Experience Problem: Score (0 is Best10 is Worst)_____.</p>

Figures 15 a-d illustrates The Merry Symptom Chase for Mind-Body Healing as an unstructured approach that is only appropriate for highly experienced professionals in mental health. Each therapeutic encounter is a unique co-creative experience that could conceivably contribute as much to the therapist's professional growth as well as the patient's personal development in terms of gene expression and brain plasticity. This is a speculation that will require careful investigation by research in evidence-based medicine.

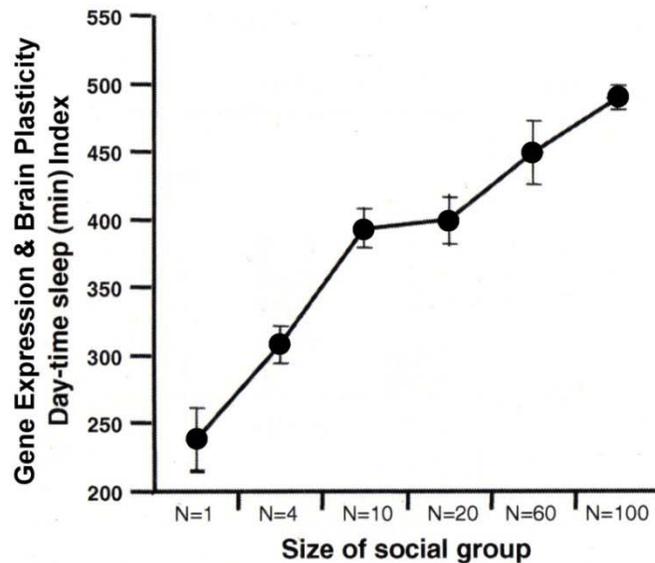
The final image 15d in this therapeutic process was drawn from the live action scene of the enthusiastic response of an audience of thousands of professionals who witnessed this videotaped demonstration at an Ericksonian congress of psychotherapy. Such a positive enthusiastic response requires some comment. Why do we have audiences to therapeutic process or, more generally, to many significant artistic and dramatic social events on many levels ranging from secular business and political meetings to the spiritual rituals of most cultures? It is easy enough to say that such audiences are there for education, to support a cause, etcetera. But what could be happening at a deep psychobiological level of activity-dependent gene expression and brain plasticity? We propose that an answer is forthcoming from the new science of epigenetics, which we outline here as the psychosocial genomics of gene expression and brain plasticity (Rossi, 1972/2000, 2000, 2002a, 2002b, 2004a, 2005-2006, 2007, 2008; Rossi & Rossi, 1996, Rossi, Rossi, Yount, Cozzolino & Iannotti, 2006; Crespi, 2007).

CHAPTER 13

Epigenetics

The Psychosocial Genomics of Gene Expression and Brain Plasticity

At this time we offer a speculative interpretation that is consistent with the neuroscience and bioinformatic perspective we are presenting in this chapter. Figure 16 is the result of recent bioinformatic research on fruit flies that illustrates how gene expression and brain plasticity within an individual fruit fly is related to the size of the social group it is in. Of course, this is established here for fruit flies only. Yet the researchers consider this an example of a deeply conserved and constitutive nature of molecular-genomic experience at this deep psychobiological level of life. This means that it is highly likely that it is a life process that is common to most species – possibly including humans.



16. Preliminary evidence of an association between the size of a social group, gene expression, and brain plasticity that needs to be confirmed for humans (modified from Ganguly-Fitzgerald et al. 2006).

This generalization to the human level would certainly have many profound implications for understanding the psychosocial genomics of human behavior ranging from the dynamics of personal relationships to families, groups, and the madness of crowds, politics, war and peace as well as the seeming uncanny efficacy of psychotherapeutic demonstrations in the history of classical hypnosis (Tinterow, 1972).

Epigenetics and psychosocial genomics is the newly emerging study of how our psychological and social environment interacts with gene expression in everyday life as well as the creative dynamics of human experience in the cultural arts, sciences, and healing (Lloyd & Rossi, 1992, 2008; Rossi, 2002b). Classical Mendelian genetics focuses on genes as the units of biological heredity that are transmitted from one generation to another through sexual reproduction. Today we know, however, that many classes of genes are expressed (activated, turned on or off), from moment to moment in everyday life, to carry out the essential life functions of homeostasis, adaptation, learning, and healing. The infinite variety of human experience in creatively oriented therapeutic hypnosis, psychotherapy, and the healing arts will always defy simple reductive analysis. In brief book we can only offer a tentative outline to help students and therapists conceptualize the deep psychobiology of therapeutic hypnosis on all levels from gene expression and brain plasticity to the psychosocial dynamics of problem solving and healing.

The theory, research, and clinical applications of psychosocial and cultural genomics to psychotherapy, therapeutic hypnosis, and rehabilitation as presented here are highly controversial, however, and now require extensive research to meet the criteria of evidence based medicine (EBT). The key concept of epigenetic and psychosocial genomics is that many forms of psychobiological arousal and rest during the various states of waking, sleeping, and dreaming can evoke immediate-early genes (IEGs), behavioral state-related gene expression (BSGE), and activity-dependent gene expression (ADGE) to optimize the synthesis of proteins to facilitate brain plasticity, problem solving, and healing in the classical four-stage creative cycle. While gene expression is currently being documented as a source of individual differences between human groups (Couzin, 2007), the significance of gene expression and brain plasticity for human behavior, consciousness, relationships, and health remains a topic of scientific research, scrutiny, interpretation, and controversy at this time (Rakic, 2006; Rossi, Iannotti et al., 2008, in press).

A Pilot Study of Mind-Gene Communication in Humans

We began this chapter with a Key Concept of Psychosocial Genomics: *“Nothing, it seems turns on gene expression and brain plasticity as much as the presence of others on the same species!”* We said this psychosocial concept was “conserved by evolution!” This simply means that nature found brain-mind-gene communication so useful that most of forms of life from fruit flies to humans adopted it. What scientific evidence do we have today that explores the validity of this fascinating communication process between mind and gene in humans?

A recent pilot study with our colleagues in Italy makes a new beginning to answering this question about the famous Cartesian Gap between mind and body (Rossi, Iannotti, et al., 2008, in press). In the past decade DNA microarray technology has made it possible to measure the expression levels of many thousands of genes simultaneously in a single experiment. This novel experimental approach has revolutionized research in molecular biology and become a new standard in personalized medicine. Recent research has documented the use of DNA

microarrays for assessing therapeutic responses to psychological relaxation and meditative practices on the molecular-genomic level. This has led to calls for further research on the pathways of psychotherapeutic processes on all levels from mind to gene. In our pilot study we use DNA microarrays to assess our new therapeutic protocols as presented in this book, particularly *The Four Stage Creative Process with Hand Mirroring* as outlined in chapter nine.

Our pilot study assessed the hypothesis that a top-down creatively oriented positive human experience can modulate gene expression on the molecular level. A DNA microarray data analysis of the white blood cells of three human subjects was performed immediately before, one hour after, and 24 hours after an experience of *The Four Stage Creative Process with Hand Mirroring*. We documented changes in the expression of 15 early response genes within one hour (see table one) that apparently initiated a further cascade of 77 genes 24 hours later.

Table Two: The Modulation of Gene Expression in Human Leukocytes By a New Protocol for Optimizing Therapeutic Hypnosis and Psychotherapy, “*The Creative Psychosocial Genomic Healing Experience*.” The Gene Bank Accession, Gene Symbol, Gene Description and results in fold changes in up-regulated gene expression in response to therapeutic hypnosis.

GB_Accession	Gene_Symbol	Description	Fold Change
AK057104	RPE65	Homo sapiens cDNA FLJ32542 fis, clone SMINT2000537 Sodium-coupled neutral amino acid transporter 2	1.777714817
NM_000329		Retinal pigment epithelium-specific protein (65kD)	1.664647867
AK055997		Homo sapiens cDNA FLJ31435 fis, clone NT2NE2000612 Ring Finger protein 165	1.617968537
AK056729		Homo sapiens cDNA FLJ32167 fis, clone PLACE6000450 Serpine B Proteinase Inhibitor	1.596523872
NM_001074	UGT2B7	UDP glycosyltransferase 2 family, polypeptide B7	1.578875081
BC018130	F2RL1	Coagulation factor II (thrombin) receptor-like 1	1.506199199
NM_030824	FLJ14356	Hypothetical protein FLJ14356 zinc finger protein 442	1.469687506
NM_021122	FACL2	Fatty-acid-Coenzyme A ligase, long-chain 2	1.380622376
NM_004126	GNG11	Guanine nucleotide binding protein 11	1.372082479
NM_020980	AQP9	Aquaporin 9	1.366899043
NM_001186	BACH1	BTB and CNC homology 1, basic leucine zipper transcription factor 1	1.330834867
NM_002921	RGR	Retinal G protein coupled receptor	1.312291611
NM_024911	FLJ23091	Hypothetical protein FLJ23091 G protein-coupled receptor 177 Isoform 1 and Isoform 2	1.274787709
NM_000860	HPGD	Hydroxyprostaglandin dehydrogenase 15-(NAD)	1.224585804
NM_002110	HCK	Hemopoietic cell kinase	1.190732546

The meaning and implications of our pilot study summarized in table one will now require a great deal of exploration and verification by others. This will open a new visionary perspective on the nature of consciousness as well as the art, beauty and truth of therapeutic hypnosis, psychotherapy, pastoral counseling, and rehabilitation in the human endeavor.

Summary: An Invitation to Open Source International Research

This little book from The Milton H. Erickson Institute of the California Central Coast outlines a series of images from neuroscience and bioinformatic research, which we propose as an innovative foundation for psychotherapy, therapeutic hypnosis, and rehabilitation today. These images present psychotherapy as a “creative dialogue with our genes.” This rapidly evolving approach is the foundation of an educational program for students and professionals in one, two, and three-day workshops presented by our institute and the Ernest and Kathryn Rossi Non-profit Foundation for Psychosocial Genomics. While we believe this creative approach is consistent with a great deal of current neuroscience and generations of practical clinical experience, it has not been validated to meet the criteria of evidence based medicine (EBT) and Cochran meta-analysis. We therefore invite students, researchers, and clinicians to cooperate with us in evaluating the creative approaches we outline with the combined technologies of standardized psychological scale construction, functional magnetic resonance (fMRI), DNA microarrays, and the Allen Brain Atlas (Rossi, Rossi, Yount, Cozzolino & Iannotti, 2006). Please visit us at <http://www.ernestrossi.com> or contact us via email via Ernest@ErnestRossi.com or Kathryn@ErnestRossi.com to share ideas and resources for such open source research.

CHAPTER 14

Workshop Evaluation & Research Form

1. Four Stage Creative Process with Hand Mirroring

Therapist Evaluation:

1 2 3 4 5 6 7
Not Effective Neutral Highly Effective

Therapist Ease of Learning:

1 2 3 4 5 6 7
Very Difficult Neutral Very Easy

2. Psychotherapeutic Focusing for Clarity & Strength

Therapist Evaluation:

1 2 3 4 5 6 7
Not Effective Neutral Highly Effective

Therapist Ease of Learning:

1 2 3 4 5 6 7
Very Difficult Neutral Very Easy

3. Brief Problem Solving by Integrating the Opposites

Therapist Evaluation:

1 2 3 4 5 6 7
Not Effective Neutral Highly Effective

Therapist Ease of Learning:

1 2 3 4 5 6 7
Very Difficult Neutral Very Easy

4. The Merry Symptom Chase for Mind-Body Healing

Therapist Evaluation:

1 2 3 4 5 6 7
Not Effective Neutral Highly Effective

Therapist Ease of Learning:

1 2 3 4 5 6 7
Very Difficult Neutral Very Easy

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