

## **The Future Orientation of Constructive Memory: An Evolutionary Perspective on Therapeutic Hypnosis and Brief Psychotherapy**

Ernest Rossi, Roxanna Erickson-Klein, and Kathryn Rossi

### **Abstract**

We explore a 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 then generalize a current evolutionary theory of sleep and dreaming, which focuses on the *future, prospective memory system*, to conceptualize a new evolutionary perspective on therapeutic hypnosis and brief psychotherapy. The implication of current neuroscience research is that activity-dependent gene expression and brain plasticity are the psychobiological basis of adaptive behavior, consciousness, and creativity in everyday life as well as psychotherapy. We summarize a case illustrating how this evolutionary perspective can be used to quickly resolve problems with past obstructive procrastination in school to facilitate current and future academic success.

**Keywords:** Brain plasticity, consciousness, creativity, evolution, gene expression, constructive memory, permissive suggestion.

For 200 years, hypnosis has explored memory in studies that have traditionally focused on its role in 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 (Daudi & Carruthers; 2005; Miller, 2007). Schacter and Addis (2007), for example, emphasize that memories are not exact replicas of the past, and further, such exact records of the past would not be

Address correspondence and reprint requests to:

Ernest Rossi  
125 Howard Ave  
Los Osos, CA 90264  
Email: Ernest@ErnestRossi.com

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. This reconstructive approach is the basis of the recent “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).

We now propose that this future orientation of the brain’s *sadaptive* 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 therapeutic hypnosis and brief psychotherapy. Historical hypnosis and classical psychoanalysis attempted to utilize the *past record keeping function of memory* and its revivification to establish its theoretical and therapeutic causal efficacy in psychotherapy and healing. As indicated by Schacter (2001) and many others (Dudai & Carruthers, 2005; Jamieson, 2007), however, 100 years of research as well as common experience in jurisprudence has cast considerable doubt on the validity of the *past record keeping function of memory* as a causal factor in mental life.

What, by contrast, would be the essential mechanisms of the *brain/behavioral system of the future orientation of constructive memory* that we propose to utilize in therapeutic hypnosis? Could this future orientation of memory provide a short cut to brief psychotherapy? Would the facilitation of constructive memory provide us with a practical and easily learned model of therapeutic hypnosis? Sidarta Ribeiro’s evolutionary theory of sleep and dreaming offers insights into these questions.

#### **Ribeiro’s Evolutionary Theory of Sleep and Dreaming**

The central hypothesis of Ribeiro’s (2004) evolutionary theory of sleep and dreaming is that dreams are probabilistic simulations of past events and future expectations. The adaptive function of such simulations is to construct and explore novel behaviors for future survival. A salient function of dreams is to utilize memories processed during the circadian cycle of waking, sleeping, and dreaming for the creation, selection and generalization of adaptive scenarios about the world (Lloyd & Rossi, 1992, 2008).

Ribeiro et al. (1999, 2002, 2004) provide extensive details about what they call the “cognitive role” of focusing activity-dependent gene expression and brain plasticity for adaptive behavior during the two major phases of sleep. This theory proposes that the first phase of slow-wave (SW) sleep evolved from rest in early reptiles as a quiescent, “offline state” suitable for the consolidation of new memory and learning. Consistent with much current neuroscience research, these researchers believe that this cognitive role takes place through the reverberation of novel waking patterns of neuronal activity during SW-sleep.

The second major phase of sleep, rapid-eye-movement (REM) dreaming, which is characterized by heightened cerebral activity, first evolved in early birds and mammals as a post SW-sleep state that was capable of facilitating memory consolidation by activating gene expression to make the proteins needed for generating the activity-dependent synaptic plasticity of neurons, which became the neural correlates of adaptive behavior. Mammals then evolved extended REM states of dreaming to prolong neuronal reverberation in novel ways that could promote memory reconstruction in a behaviorally adaptive manner rather than mere rote record of past events. *In brief, sleep and dreaming became an inner stage for integrating past events with current novel experiences to simulate and creatively replay the present as a rehearsal for future adaptive behavior.*



Theory and research documenting how the classical four-stage creative process (Hadamard, 1954) operates within the entirely natural circadian (~ 24 hours) and ultradian (~ 90 to 120 minutes) cycles of consciousness, SW-sleep and REM-Dream sleep to re-construct memory, learning, and adaptive has been presented in great detail (Kempermann, 2006; Lloyd & Rossi, 1992, 2008; Rossi, 2002, 2007).

**The Creative Reframing of Negative Dream Experiences and PTSD Memories into Positive and Adaptive Life Scenarios**

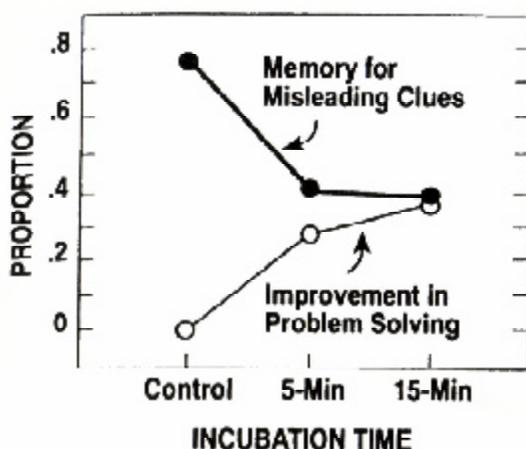
A 29-year-old graduate student presents a problem of “my oppositional tendency that leads to procrastination that stops me from finishing my doctoral thesis.” After six sessions of reviewing memories and issues related to his oppositional tendency, which led to no apparent change in his behavior, he reports a restless night of “terrible dreams.”

*Dream:* “Dark water with all sorts of disgusting fecal matter floating slowly all over the place! Then I was boating with my girlfriend and we capsize and fall into the black water sinking and drowning. Everything is dark and I am in terror and fear. I suddenly realize I’m having a nightmare and finally wake up with my heart racing.”

Associations to these two dream fragments led to a repeated recitation of his depressing memories, oppositional procrastination, and failure in writing up school reports etc., which did not appear to lead to anything new. Confronted with this seemingly fruitless review, the senior author introduced an activity-dependent, ideodynamic, two-hand approach to therapeutic hypnosis utilizing the four-stage creative process (Rossi, 2002).

The young man’s therapeutic process completed itself in about 20 minutes as indicated by the verbal record jotted down by the senior author in real time as it was taking place is a confirmation of Erickson’s (1970/2008) report of 20 minutes as a typical time frame for “dreaming” during therapeutic hypnosis. The relevance of being aware of such time periods in therapeutic hypnosis is illustrated by independent experimental research in figure two (Smith, 1995).

**Figure Two: Typical incubation time for stage two of the creative process. During incubation, that is, inner work creatively reviewed and replayed on an implicit level, the memories of misleading cue drop out simultaneously with improvement in problem solving. (With permission from Smith, 1995; Rossi, 2002).**



As indicated in figure two, it takes about 15-20 minutes for the typical creative process of problem solving in stage two (incubating or being “*stuck*”) during highly structured tasks in the laboratory (With permission from Smith, 1995).

#### *A Successful Follow-up Dream*

In his next session a week later, the young man reports this dream: “Beautiful large waves on the blue ocean. I was driving on the beach with my girlfriend and we almost got *stuck* in the wet sand. ‘Oh, shit, I yelled and slammed real hard down on the gas so we race safely up a hill together.”

We discuss the striking difference in the high *activity level* between this dream and the previous dreams of “slow floating feces,” sinking and drowning in the dark water 2 weeks ago and his fast slamming on the gas in this dream. We can only speculate that there may be a connection between his successful action in this dream and the inner work of therapeutic hypnosis we did in the previous session. Did the therapeutic hypnosis *heighten his mental activity level* sufficiently to actually facilitate *activity-dependent gene expression and brain plasticity* on a molecular-genomic level (Rossi, 2002, 2004, 2007)? We acknowledge that this is only an implication of current neuroscience research at the present time that requires further documentation. Note how simply discussing the *novel, numinous, and salient possibilities* of creative activity turning on activity-dependent gene expression and brain plasticity could function itself as a highly permissive suggestion (*priming* or an *implicit processing heuristic*) for it to actually happen. A moment later the young man begins recounting how he got “hot” and successfully wrote a doctoral dissertation outline “in a burst of inspiration” this week that was well received by his graduate school.

#### **Summary**

The distinction between the future oriented, constructive memory system investigated in current neuroscience and the past, retrospective memory system that was the theoretical foundation of therapeutic hypnosis and psychotherapy is explored. An evolutionary theory of sleep and dreaming is generalized to conceptualize a new evolutionary foundation for therapeutic hypnosis and brief psychotherapy for solving current life problems by facilitating adaptive future life scenarios. The dynamics of this constructive, evolutionary orientation on all levels from activity-dependent gene expression and brain plasticity to the cognitive, experiential, and behavioral are utilized for developing new skill sets in utilizing permissive suggestions for facilitating the creative process in therapeutic hypnosis and brief psychotherapy that could be applied to a variety of counseling, educational, pastoral, rehabilitation, and hospice situations.

#### **References**

- Dudai, Y., Carruthers, M. (2005). The Janus face of mnemosyne: *Nature*, 434, 567.  
Erickson, M. (1948/2008). Hypnotic psychotherapy. In Rossi, E., Erickson-Klein, R. & Rossi, K. (Eds.). *The complete works of Milton H. Erickson, M.D. On therapeutic hypnosis, psychotherapy, and rehabilitation: The neuroscience edition: Vol. 2: Basic hypnotic induction and suggestion*. Phoenix: MHE Press.

- Erickson, M. (1958/2008). Naturalistic techniques of hypnosis. In Rossi, E., Erickson-Klein, R. & Rossi, K. (Eds.). *The complete works of Milton H. Erickson, M.D. on therapeutic hypnosis, psychotherapy, and rehabilitation: The neuroscience edition: Vol. 1: The nature of hypnosis*. Phoenix: MHE Press.
- Erickson, M. (1959/2008). Further clinical techniques of hypnosis: Utilization techniques. In Rossi, E., Erickson-Klein, R. & Rossi, K. (Eds.). *The complete works of Milton H. Erickson, M.D. on therapeutic hypnosis, psychotherapy, and rehabilitation: The neuroscience edition: Vol. 1: The nature of hypnosis*. Phoenix: MHE Press.
- Erickson, M. (1964/2008). The burden of effective psychotherapy. In Rossi, E., Erickson-Klein, R. & Rossi, K. (Eds.). *The complete works of Milton H. Erickson, M.D. on therapeutic hypnosis, psychotherapy, and rehabilitation: The neuroscience edition: Vol. 3: Openminds: innovative psychotherapy*. Phoenix: The MHE Press.
- Erickson, M. (1970/2008). Hypnosis: Its renaissance as a treatment modality. *American Journal of Clinical Hypnosis*, 13, 71-89. In Rossi, E., Erickson-Klein, R. & Rossi, K. (Eds.). *The Complete Works of Milton H. Erickson, Vol. 2: Basic Hypnotic Induction and Suggestion*. Phoenix: MHE Press.
- Erickson, M. & Rossi, E., (1989). *The February man: Evolving consciousness and identity in hypnotherapy*. New York: Brunner/Mazel.
- Gazzaniga, M., Ivry, R., & Mangun, G. (2002). *Cognitive neuroscience, 2nd ed.* Cambridge, MA: The MIT Press.
- Hadamard, J. (1954). *The psychology of invention in the mathematical field*, New York: Dover.
- Hawkins, J. & Blakeslee, S. (2004). *On intelligence*. New York: Holt & Co.
- Jamieson, G. (2007). *Hypnosis and conscious states: The cognitive neuroscience perspective*. New York: Oxford University Press.
- Ji, D. & Wilson, M. (2007). Coordinated memory replay in the visual cortex and hippocampus during sleep. *Nature Neuroscience*, 10, 100-107.
- Kempermann, G. (2006). *Adult neurogenesis: Stem cells and neuronal development in the adult brain*. New York: Oxford University Press.
- Lloyd, D. & Rossi, E. (1992). *Ultradian rhythms in life processes: An inquiry into fundamental principles of chronobiology and psychobiology*. New York: Springer-Verlag.
- Lloyd, D. & Rossi, E. (2008). *Ultradian rhythms from molecules to mind: A new vision of life*. New York: Springer.
- Miller, G. (2007). A surprising connection between memory and imagination. *Science*, 315, 312.
- Oakley, D., Deeley, Q., & Halligan, P. (2007). Hypnotic depth and response to suggestion under standardized conditions and during fMRI scanning. *International Journal of Clinical and Experimental Hypnosis*, 55, 32-58.
- Rainville, P. (2002). Brain mechanisms of pain affect and pain modulation. *Current Opinion in Neurobiology*, 12, 195-204
- Raz, A., Lamar, M., Buhle, J., Kane, M. & Peterson, B. (2007). Selective biasing of a specific bistable-figure percept involves fMRI signal changes in frontostriatal circuits: A step toward unlocking the neural correlates of top-down control and self-regulation. *American Journal of Clinical Hypnosis*, 50, 137-156.
- Ribeiro, S. (2004). Towards an evolutionary theory of sleep and dreams. *A MultiCiência: Mente Humana*, 3, 1-20.
- Ribeiro, S., Goyal, V., Mello, C. & Pavlides, C. (1999). Brain gene expression during REM sleep depends on prior waking experience. *Learning & Memory*, 6: 500-508.

- Ribeiro, S., Mello, C., Velho, T., Gardner, T., Jarvis, E., & Pavlides, C. (2002). Induction of hippocampal long-term potentiation during waking leads to increased extra-hippocampal zif-268 expression during ensuing rapid-eye-movement sleep. *Journal of Neuroscience*, 22(24), 10914-10923.
- Ribeiro, S., Gervasoni, D., Soares, E., Zhou, Y., Lin, S., Pantoja, J., Lavine, M., & Nicolelis, M. (2004). Long-lasting novelty-induced neuronal reverberation during slow-wave sleep in multiple forebrain areas. *Public Library of Science, Biology*. (PLoS), 2 (1), 126-137.
- Rossi, E. (1968). The breakout heuristic: A phenomenology of growth therapy with college students. *Journal of Humanistic Psychology*, 8, 16-28.
- Rossi, E., (1972/2000). *Dreams, consciousness & spirit: The quantum experience of self-reflection and co-creation*. New York: Zeig, Tucker, Theisen.
- Rossi, E. (2007). *The breakout heuristic: The new neuroscience of mirror neurons, consciousness and creativity in human relationships*. Phoenix: MHE Press.
- Rossi, E. (2008). The new neuroscience of therapeutic hypnosis, psychotherapy, and rehabilitation. In Rossi, E., Erickson-Klein, R. & Rossi, K. (Eds.). *The complete works of Milton H. Erickson, M.D. on therapeutic hypnosis, psychotherapy, and rehabilitation: The neuroscience edition: Vol. 1: The nature of hypnosis*. Phoenix: MHE Press.
- Schacter, D. & Addis, D. (2007). The gnosis of past and future. *Nature*. 445, 27.
- Smith, S. (1995). Getting into and out of mental ruts: A theory of fixation, incubation, and insight. In Sternberg, R. & Davidson, J. (Eds.) *The Nature of insight* (pp. 229-251). Cambridge, MA: MIT Press.