

Is There Science Behind Life Changing Dreams?

Bob Hoss, MS

Presented at the IASD PsiberDreaming Conference, Sep 24, 2015

In 2015 IASD solicited life changing dream stories for a planned book *Dreams that Change Our Lives*, from which over 100 were selected for the publication. Stories ranged from a life altering dream series guided by the image of Jung himself, to the experience of a powerful golden sun that stimulated a newfound inner strength ending a deep depression, to the dream of being pulled out of a deep dark hole that led to a life's career as a minister helping other souls out of their deep dark holes. The anecdotal evidence from this activity assigns a powerful psychological and transformational function to the process of dreaming. Carl Jung recognized dreams as a powerful source of unconscious wisdom that continues to transform our lives, with a natural aim of becoming a balanced, "whole" individual (Jung, 1964). This process of transformation and growth he called "individuation." In order for this to occur, a union between the conscious and unconscious, the inner and outer self, must take place. The function that arises which brings this about he termed the "transcendent function"—a function which effects a transition from our existing state to a new state, manifesting as a new attitude. This process was observed throughout a great majority of the dream stories received.

Is the life changing power of dreams simply our waking imagination interpreting an inspiring dream story, or is there a natural purposeful process taking place within the dream which can truly transform our lives whether we recall the dream or not? Is the dreaming process and the state of our dreaming brain really capable of such transformation?

A Psychological View

Jung is not alone in his view of the dream as a place for new learning and transformation. Other contemporary psychologists and researchers have concluded that dreams can promote new learning—in particular adaptive learning, helping us adapt to stress (Stewart & Koulack, 1993); test and modify concepts and social skills (Coutts, 2008); and test threat avoidance scenarios in the safe virtual environment of the dream (Revonsuo, 2000)—all to better prepare us for dealing with waking life. Perhaps Ernest Hartmann (2011) stated it best: "Dreams are an emotion guided, hyper-connective mental function which is part of how the brain learns by creating new connections and weaving new material into established memory; providing new insight which can help us make new decisions." This concept might be best illustrated with an example, a simple story-like dream that drove a decision reversal within the dream subsequently reflected in a decision reversal in waking life.

The dreamer was offered a teaching position in an area of expertise he had abandoned many years before. He felt he could never resurrect his talents so he decided to turn it down the next day. That night he had the following dream: "I was wandering through a desert and saw an old rusty car. I looked inside and found a man who was not moving. I was going to give him up for dead. My unknown companion stated he may be just asleep and urged me to wake the man. I argued that it was useless but after much discussion I reluctantly gave in and shook the man. When I did, both the man and the car came to life and the car transformed

into a newer car.” In this case the learning appeared to occur within the dream. The next day the dreamer accepted the assignment, having reversed his decision. It was only upon reflection much later that he recognized the role the dream may have played in this change.

There certainly appears to be a purposeful problem-solving process taking place in this dream. The dream begins by picturing the dreamer (the dream ego) in the conflicted environment, “illuminating the patterns in the dreamer’s memory related to the emotional concern” as Hartmann (1996) would put it. It “reveals the unconscious aspect of the conscious event” and “presents it as emotionally charged picture language” as Jung contends (Jung, 1964, p. 5); the old rusty car depicting the dreamer’s dysfunctional beliefs and view of his talents: old, rusty and dead. The dream then proceeds to resolve the conflict by attempting to alter the old belief of the dream ego. Jung stated that the “transcendent function” brings about change by “compensating” or correcting for misconceptions that stand in our way (Jung, 1971, p. 279). This concept found recent support in a research study by McNamara (2002) who observed that compensating themes, which he termed counterfactuals, were found in 97% of dreams studied in the 50-subject pilot. McNamara (2012) explained counterfactuals as mental simulations of what might happen if a different decision was made, or imagined scenarios that promote an alternative outcome. Note in the dream example it was the introduction of a counterfactual or compensating viewpoint (*wake the man he may just be asleep*) by an unknown companion that resulted in the subsequent change or reversal by the dream ego. Once the dream ego reversed its viewpoint it appears that the dream emotionally reinforces that decision with a rewarding ending. Ernest Hartmann stated that it is emotion that guides the new connections in our memory systems and organizes our memory. Perhaps it is the emotional reinforcement or self-reward of a positive dream ending that reconsolidates the new learning, all within the dream.

A Memory Reconsolidation View

In order to understand how the dreaming process, or REM sleep state, might bring about resilient change, it might be helpful to understand the principle of transformation from the perspective of recent memory reconsolidation research. A study by Nader, Schafe and LeDoux (2000) concluded that even strongly consolidated memories (old learning) can be made unstable and readily open to change when we recall them. Similar studies (Ecker, 2012) have shown that when we re-experience a memory the synapses involved become temporarily labile (unlocked or deconsolidated) for about 4 to 5 hours before relocking (reconsolidating). If a critical new learning experience takes place during that “reconsolidation window” the old learning can be altered or replaced by the new learning. In Bruce Ecker’s review of ten of the animal and human studies from 2004 to 2009, he observed three common elements to this process which he termed the “transformation sequence”: 1. reactivate (recall, deconsolidate) the original learning; 2. create a mismatch scenario, an experience contradictory to that original learning; 3. juxtapose the two in a new learning experience during the “reconsolidation window” that revises the old learning such that the memory reconsolidates with the new learning. While this process is based on waking state research, it might be interesting to note how closely this “transformation sequence” resembles the theoretical dream processes discussed in the previous section and also how well it mirrors the actions in the dream example. The example is repeated here with action points noted in [brackets] for comparison.

“I was wandering through a desert and saw an old rusty car. I looked inside and found a man who was not moving. I was going to give him up for dead. [A] My unknown companion

stated he may be just asleep and urged me to wake the man. [B] I argued that it was useless but after much discussion I reluctantly gave in and shook the man. [C] When I did, both the man and the car came to life and the car transformed into a newer car. [D]

At [A] we can observe the pictorial representation of an illumination (Hartmann) or reactivation/deconsolidation of the old learning—the old attitude or belief. At [B] we see the creation and juxtaposition of a contradictory scenario, a compensation (Jung) or counterfactual (McNamara). At [C] we can see a juxtaposing of the two in a new learning experience which results in the eventual acceptance and reversal by the dream ego. Finally at [D] we see emotional reinforcement of the reversal, suggesting an initiation of reconsolidation with new learning; emotion driving the organization of the new connections within memory as Hartmann put it.

A Jungian View

Although this is only one small example, Jung (1964) observed this sequence as a core archetypal transformative process pictured in dreams as a symbolic cycle of: *death of the ego* [deconsolidation]; *compensation* [introducing a contradictory scenario]; *integration of opposing myths* [juxtaposition in a new learning experience]; and ultimately *rebirth* [reconsolidation with the new learning]. We can see Jung's terminology for the transformation cycle play out almost literally in this next case example:

The young woman had just been fired from a job for the second time. This drove her into a deep depression and an expressed attitude that, "I have no future, it is all over for good." At that point she had the following life altering dream. "I dreamed a building fell on me and I was crushed under the rubble. All went dark and I stopped breathing. I knew I was dead and it was all over, there was no future [death of the ego metaphor]. Then I became another person in the dream who was strong and determined, and dug my body out of the rubble [compensating scenario introduced]. Suddenly I came back to life and realized that I could go on [integration of juxtaposed scenarios and new learning presented as a rebirth metaphor]." It was apparent that a change was made. Subsequent to the dream she set out to start her own company. Today she runs three.

A Dreamworking View

Although the examples so far illustrated learning that occurred while in the dream, Hartmann stated that "the entire dream to waking continuum is adaptive" (Hartmann, 2011), implying that the emotional impact and waking reflection on the dream might continue the process of change. This is indeed what dreamwork is all about. Here is a short example.

A student of mine complained at times about her married life, pretty much convinced that all of their problems originated with her husband. Then she had a dream that changed this perception for good. She reported, "I have had a recurrent dream of being terribly angry with my husband, who I am always running away from. I had another one this week but this time I turned around and faced my husband and looked at his face—it was my father's face!" She woke in shock and realized, upon reflection on the dream and her marriage, that it was the unfinished business with her father that she was projecting onto her husband which was at the core of their problems.

Here we again see a case where the dream illuminates (deconsolidates) the dysfunctional emotional learning (anger at her husband) then produces an image which pictorially juxtaposes a

contradictory scenario (her father’s face on her husband’s body). Although the dream ended at that point, the emotional impact stayed with her whereas the new learning seemed to take place upon waking reflection. From this theoretical discussion it appears that dreams may have the capacity for transformation, either totally within the dream, or as a part of the dream-to-waking continuum; but is there any neurological evidence that the dreaming brain really has this capability?

A Neurological View

Over the last decade, brain imaging technology by such research teams as Maquet in 1996, 2000 and 2005; Braun in 1997; and Nofzinger in 1997 reveal centers of the brain that are active during REM (summarized in Hobson, 2003; Desseilles, 2011; and Dang-Vu, 2007). Figure 1 illustrates the REM active centers in white, and the inactive centers in gray. Although imaging has not isolated specific functions and correlated them with a dream experience, waking state studies on these centers compared with dream observation suggest that the dreaming brain may indeed have the capacity for problem resolution, decision making, and adaptive learning (Pace-Schott, 2007), as well as for transformative learning—replacing old beliefs with new schemas which are tested, learned and re-consolidated in the dream state.

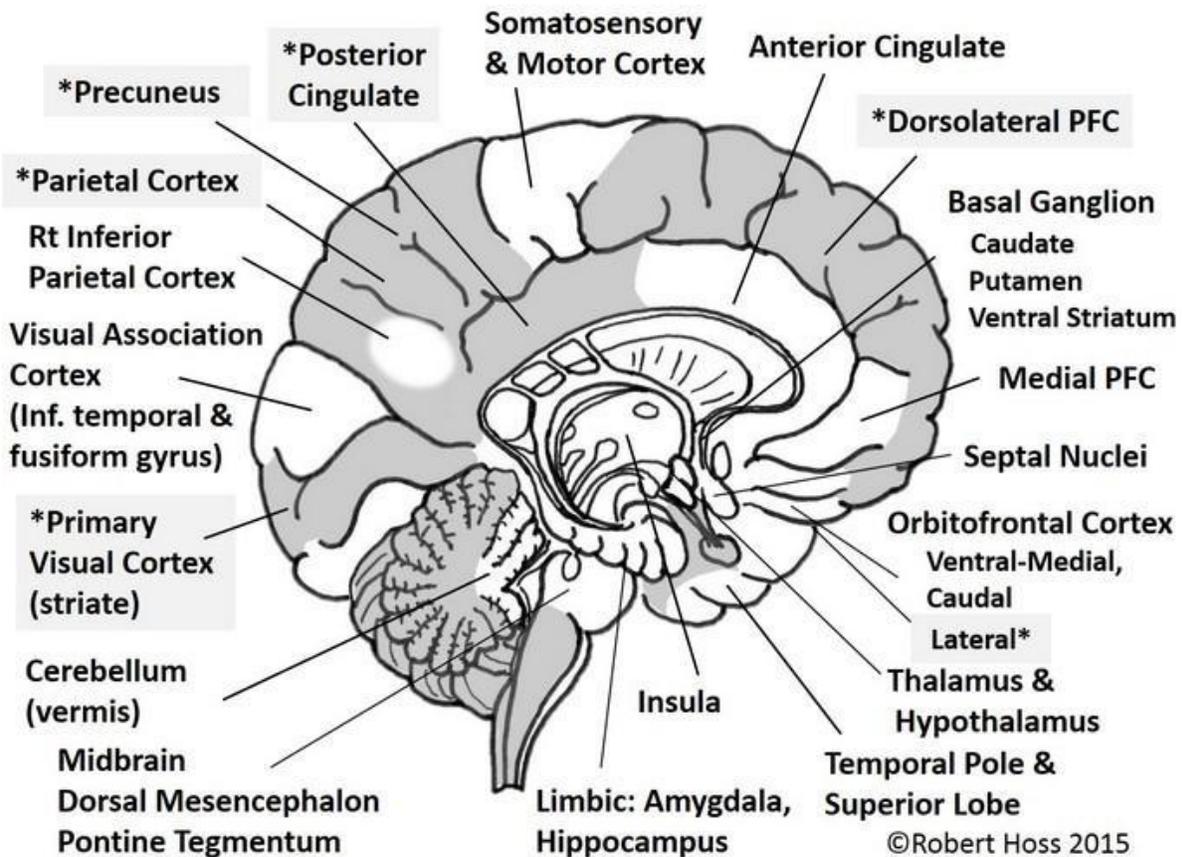


Figure 1 – The Dreaming Brain (REM state)
(Active in White, relatively *Inactive Shaded)

The first step in transforming dysfunctional learning is illumination of the relevant memories, as Hartmann indicated. The above imaging studies indicate that in REM sleep, where our more vivid dreams take place, our “emotional brain” (limbic system) is highly active. This has led researchers to conclude that dreams replay (Wilson, 2011) and selectively process emotionally relevant memories via interplay between the cortex and the limbic system (Seligman and Yellin, 1987) and that these emotional memories “orchestrate” the dream activity (Dang-Vu et al., 2007). More importantly, for change to occur, the dream must act on the dysfunctional learning in a manner which alters it, perhaps providing alternative scenarios which can be tested, learned, and woven into existing memory systems as theorized above. If we review the waking state neurological studies on the functions that REM active centers are involved in, and note those activities that appear observable in dream content, an interesting picture emerges. A review of various REM active frontal centers (anterior cingulate, basal ganglion, medial prefrontal cortex, insula, orbitofrontal) along with emotion and memory processing centers (amygdala and hippocampus) found them to be involved (individually or networked) in the performance of the functions listed below (Hoss, 2012, 2013). For comparison purposes I organized the data into general functional categories [referencing the “transformational sequence” in brackets].

a) Problem Detection [memory deconsolidation?]: The anterior cingulate, basal ganglia and orbitofrontal cortex have been found to be involved in: detecting and inspecting conflict, adverse conditions, anomalies, and events that deviate from expectation, particularly those involved in social and self-referential activity.

b) Plan Generation [introducing an opposing scenario?]. The anterior cingulate, medial prefrontal cortex and basal ganglia have been found to be involved in: generation of paradoxical behavior metaphors and introspective self-referential behavior stimulation and rehearsal; involvement in goal directed behavior and reward processing, motivation to seek eventual rather than immediate reward

c) Scenario Testing [juxtaposition in a learning experience?]: The anterior cingulate, medial prefrontal cortex and insula have been found to be involved in: mediating action to choose between conflicting perceptions; mediating behavior in novelty-related or emotionally-guided decision making and providing cues to other areas of the brain; observing the outcome of an imagined scenario, monitoring the consequences and selecting an appropriate response; changing or adapting behavior if the outcome is not as expected; insight; self-monitoring the learning and providing a ‘sense of knowing’ and a retrospective confidence judgment.

d) Reinforcement and Learning [reconsolidation?]: The anterior cingulate, medial prefrontal cortex, orbitofrontal cortex and basal ganglia have been found to be involved in: selecting which response to make or inhibit based on anticipating and valuing rewards, regulating planning behavior based on reward or punishment so as to change behavior, serving an adaptive function of extinction learning. The hippocampus is involved in memory consolidation.

If these functions continue, even in part, into the dream state, the dreaming brain certainly would have the capacity for transformative activity. However, neurological research has yet to be done that captures these centers actually functioning together in this manner during a dream. But if we can observe these specific activities in dream content, it is suggestive that such a process is taking place. While only a few examples could be provided here, I have observed these activities to be present in varying degrees in hundreds of dreams since 2009 when I began to observe and test them in a dreamworking protocol (*Transformational Dreamwork* worksheets available on

www.dreamscience.org). Additional case studies are included in the *Dream to Freedom* practitioner's handbook (Hoss & Hoss, 2013). In order to demonstrate this further, however, a more formal content analysis aimed at testing for these specific activities in a random selection of story-like dreams, is a recommended next step (Hoss, 2012).

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