

The Dream Always Makes New Connections: The Dream is a Creation, Not a Replay

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I will argue here that every dream makes new connections and that every dream is a creative product not a replay. I will summarize evidence that even dreams usually thought of as replays -- recurrent or repetitive dreams and PTSD dreams -- turn out to be new creations, rather than replays. I will discuss the implications of this view for the functions of dreaming. The data suggests that dreaming is not involved in the consolidation of memory, but rather in integrating new memories into memory schemes, guided by emotion. This view of dreaming also has implications for making use of dreams in therapy and in self-knowledge.

There is a view that dreaming or at least dreaming in REM sleep involves a replay of material experienced in waking and that therefore dreaming is involved in the consolidation of memory. This view is based in part on the frequent appearance of bits of waking experiences in dreams ("day residue") and in part on recent studies showing that in rats hippocampal "place cells" fire during REM sleep in a pattern similar to their firing while the rats navigated a maze some hours earlier [1, 2]. I will show that studies of human dream content do not support the idea of replay.

A dream may certainly incorporate events that occur the day or days before the dream (the "day residue"). In fact incorporation of daytime material into dreams has been studied in some detail [3, 4]. It appears that bits of daytime material found in dreams come especially from the day of the dream, with some evidence suggesting that material from about one week prior to the dream is also favored. I have reported that material from about two hours before sleep onset on the day of the dream is the most likely to show up in dreams [5].

However in all the dream series I have studied, the dream does not repeat the waking material, but changes it, combines it, and weaves it into an ongoing story. For instance, consider dream setting: the dream often takes place in a specific spot or town known from waking life,

sometimes a place the dreamer has visited or spent time in recently. But just as often the setting is a combination of several places. (I often dream of a city that's Boston, but it's also New York. Both are cities that I have lived in and know well. Even if the setting is definitely one city, the more details I remember the more it seems that it's not exactly the same as the city I know in waking life.) And what happens in the setting is invariably different from what happened in waking life.

The characters in the dream may be people you know, or people you have seen recently, or strangers, or people who seem familiar but you're not sure who they are. And the characters are notoriously shifty -- they are sometimes two people at once, or one person, but he's not quite right, there's something different about him, he looks a bit like someone else.

In terms of actions or occurrences in the dream, a dream does sometimes refer to or "picks up" something that happened recently, most often on the day of the dream. There's never (I should say "almost never" to be on the safe side) a replay of a waking event, even if it's a powerful or emotional event even a trauma (see below).

My collaborators and I have studied many series of dreams after trauma [6]. We saw no dreams that replayed the traumatic events or other events exactly as they occurred. We recently completed a systematic study of dreams before and after 9/11/01. Forty-four persons who had been keeping dream journals for years each sent us 20 dreams from their records -- the last 10 recorded before 9/11/01 and the first 10 after [7]. The 880 dreams were examined and scored on a blind basis. The most important finding of the study was that the intensity of the Central Image (based on a reliable rating scale [6]) was significantly higher in the "after" dreams. There was no difference in dream length, dream-likeness, vividness, and several other measures. Most important for the present argument is that not a single one of the 880 dreams (440 of them after

9/11) involved planes hitting tall buildings or similar scenarios, even though all the participants had seen these events many times on television (and it was clearly an emotionally important experience). No scenes were pictured that were even close to the actual attacks. So even something as striking as the 9/11 attacks does not generally appear in dreams as a replay.

But aren't there exceptions – for instance, aren't there many reports of recurrent dreams, repetitive dreams, and especially repetitive dreams of trauma (PTSD dreams)? Don't these dreams replay frightening events from the dreamer's life? Recurrent dreams have indeed been the subject of a number of studies [8, 9, 10]. Usually recurrent dreams are frightening dreams most often beginning in childhood. However, these dreams are really dreams about a recurrent theme. The dreams cited in the studies above and dreams I have surveyed are never or almost never precisely repetitive dreams. And they do not replay waking life events though they may incorporate bits of material, for instance from a traumatic childhood. The general theme of the dreams is the same each time, but there are usually changes in the dream as the dreamer's life and the dreamer's emotional state changes.

A patient in psychoanalysis provided an especially clear series of nightmares, which appeared to reflect her mental state. This very intelligent young woman did report having recurrent dreams. She described a series of dreams going back many years, which involved sharks or shark-like monsters chasing her in the ocean. In one dream she was held captive by shark-monsters who were going to torture or kill her. The details varied, but the dangerous shark theme was constant. These dreams seemed to occur especially when some important change was happening in her life. They also occurred a number of times during her psychoanalysis, at the times when she was unsure of herself and when she seemed to be re-experiencing childhood fears and childhood helplessness. Over the course of several years she made gradual progress in

understanding her life and overcoming her fears. During this time she had several more dreams of sharks, but the sharks gradually became less terrifying than before. She no longer woke up scared whenever she dreamt of a shark. Finally, at a time when she was finishing her treatment, when her life and work were going well, she had one final dream of a shark. This time she was at a swimming pool rather than in the ocean. A friendly little shark came out of the swimming pool right next to her. She patted it on the head and it curled up at her feet like a pet dog! [11]. Obviously the “recurrent dreams” here kept the theme of a shark but changed to reflect her emotional state. They were not exactly repetitive, and obviously, they were not replays of actual events.

Thus, recurrent dreams are usually not exactly repetitive dreams. Does this mean that there is no such thing as a repetitive dream? No, there are repetitive dreams though they are not frequent. There is in fact one situation in which the same dream is experienced again and again -- the post-traumatic dreams that occur in PTSD. These posttraumatic nightmares are indeed one diagnostic feature in making the diagnosis of PTSD according to DSM-IV [12]. I have studied such dreams both in my research work and in clinical work with veterans and others. Even these truly repetitive dreams, sometimes described as replays of waking events, turn out on examination to be creations, not simple replays of waking events.

Often the veteran suffering from PTSD says, “The dream is just the way it was... I was in a foxhole...noise all around me... a shell explodes... just the way it was!” But in all the cases I have examined in detail, the dream is not “just the way it was.” There’s at least one important change. For instance, one of the most common dreams in Vietnam veterans goes something like this, “I’m back there in the foxhole. Just the way it was. There’s noise all around. A shell explodes right in front of me. I scream and I’m dying as I wake up.” What actually happened

was that a shell exploded and killed the man's buddy – his best friend - who was in the foxhole with him, or somewhere nearby. The dream does not simply replay the event. It adds a slight but important change: the dreamer himself is dying rather than his buddy. This appears to be a replay of the events, but slightly altered, probably by an emotion -- the emotion known as survivor guilt: the dreamer feels guilty that he survived while his buddy died. Thus, even these so-called repetitive post-traumatic dreams involve the making of new connections. And the connections are guided by emotion, which we consider a basic characteristic of dreaming in general [13, 14, 15]. These dreams too turn out to be creations, not simple replays of events.

The most dramatic example in my experience occurred in a Vietnam veteran who suffered for years from PTSD. He had been a medical corpsman and his job consisted of working just behind the front lines, loading wounded soldiers and body bags off of a helicopter returning from the lines. His job involved getting the wounded men to the right places for treatment and properly identifying dead soldiers in the body bags. The most traumatic event he experienced occurred just after a serious battle. He was opening body bags one after another and found his best buddy in the last body bag he opened. He has dreamt about his experience over and over again for many years. He indeed does have a repetitive dream, which occurs unaltered time after time. In reporting the dream he says, "I open up the body bags one by one, I zip open the last body bag. The body inside is ME, and I wake up screaming." Obviously he has taken a serious traumatic incident and changed it slightly in his dreams so that it is he rather his friend who has died. One can see this dream as picturing terror and vulnerability, but also guilt, related to his having survived while his buddy died. So even here, in a repetitive PTSD dream, something new has been added. The repetitive dream is not simply a replay of waking events. My colleagues and I have studied many traumatic dreams with a very similar structure.

Dreaming is Hyperconnective

Returning to dreams in general, my conclusion is that new connections are always involved. Indeed dreams are hyperconnective. Actually, there is little disagreement on this point. Dreams obviously throw together a great deal of material in our minds. We all remember dreaming about a person who is like A but also somewhat like B. I often have dreams set in a house that is partly my current house and partly a previous house. Also, as mentioned I'm often in a city that is both Boston and New York.

Freud called the first and most prominent mechanism of the dreamwork "Condensation," and he had exactly this hyperconnectivity in mind. When analyzing a dream by free association, one pulls apart the elements of the condensation, looks for associations to each part, and gradually tries to reconstruct the "latent dream thoughts" – the thoughts underlying the dream. Freud's view was that most or all parts of a dream are overdetermined – they are produced by the coming together of several underlying thoughts.

Biologically oriented researchers also often speak of hyperconnectivity. However, what they have in mind is throwing things together randomly. They usually consider dreaming to be a state of random activation, exciting many parts of the forebrain, and thus throwing together all sorts of material from the memory stores [16].

Thus, basically there is wide agreement that dreams are hyperconnective, and that the connections are broader and looser than in waking. I believe that this "broader and looser" connectivity is an extremely important aspect of the nature of dreaming. Dreaming brings together things which are kept apart in waking.

First, on an anecdotal or clinical level, here is an example which clarifies this connectivity. I have heard the following dream from six different women, including both friends and patients. The dream goes something like this:

A powerful vivid dream. I dreamt about my boyfriend "Jim," but then he turned into someone else – he seemed to be my father.

Each of the six women continued: "on waking up I thought about it and I realized Jim really is a lot like my father. He's ... [and they would enumerate a number of similarities between their boyfriend and their father]. But you know something fascinating. I had never thought of it before! I had never noticed the obvious similarities until I had this dream!"

I think this provides a significant insight into the way our minds work. Apparently these women kept their thoughts, feelings, memories etc about Jim in one part of their minds – one compartment -- and their thoughts, feelings about Father in another. The compartments were entirely separate while they were awake. It took a dream to make the connection – to cross the boundary from one compartment to another. In other words while awake our thinking stays in a groove, or a rut. We keep thinking along the same straight lines. In dreaming we can jump out of the groove. This is responsible for our sometimes having all sorts of new insights based on our dreams, and occasionally making new discoveries or creating new works of art.

There have been a few attempts to demonstrate this broader and looser connectivity experimentally. Some years ago I showed, in a small unpublished study that people given a standard word association test shortly after being awakened from REM sleep produced more "distant associations" than when awakened from NREM sleep. The idea was that the broader, looser functioning of the mind and brain in REM-sleep dreaming would continue for a few minutes after awakening. Harry Fiss and his collaborators along the same lines, reported that

waking fantasy was more “unlikely” and “imagistic” after awakenings from REM as compared to NREM-sleep [17].

Robert Stickgold et al. performed a much more elegant version of this study, and obtained significant results. They measured the time in milliseconds required for subjects to recognize close or strong associations between pairs of words, versus distant or weak associations. They found that after REM-sleep awakenings the weak associations were made more quickly [18].

With a slightly different approach, we performed a large questionnaire study investigating the view that dreaming makes connections more broadly and loosely than waking and avoids tightly structured, overlearned material [19]. We did this by investigating the extent to which we read, write and calculate in dreams. We considered reading, writing, and arithmetic (the “three R’s of our schooling”) to represent the most tightly structured overlearned portions of our mental functioning.

First, two scorers examined a series of 456 dreams for any mention of reading a text, writing, typing, or calculating. The scorers agreed perfectly and found no reading, no writing, and one possible instance of calculating. Second, we obtained 240 completed questionnaires which asked a number of good dream recallers about any reading, writing, and arithmetic in their dreams. They were also asked to rate the relative prominence of six activities (walking, writing, talking with friends, reading, sexual activity, typing) in their waking and dreaming lives. The results were clear-cut. On the broad questions the respondents reported almost no reading, writing, and calculating. On the relative prominence scales reading, writing, and typing were scored far more prominent in waking than in dreaming; whereas, walking, talking with friends, and sexual activity were scored almost as frequent in dreaming as in waking.

The Dream as a Creative Product: Is a Dream Similar to a Work of Art?

As we have seen a dream always makes new connections. Thus a dream can be considered to be a creative product, and in this sense, a dream is somewhat similar to a work of art. Creating a work of art has been defined in many ways, usually emphasizing that old materials are put together in a new way -- and put together in a new way influenced by the artists' emotion [20]. This is not a random process of course: materials are put together in a way that expresses an underlying emotion or emotional theme. In other words, art in general can be thought of as making new connections guided by emotions, which is exactly the way we have described dreaming [13, 14].

Film and painting are sometimes consciously based on dreams, and films are often considered the most oneiric (dreamlike) of the arts. But other arts are based on dreams as well. A number of writers have attributed their poems or stories to dreams. Robert Louis Stevenson famously stated that his stories came to him directly from his dreams invented by his "committee of sleep" [21]. Some have understood this to mean that the stories actually came to him word for word in his dreams. From my experience, and the study on reading and writing mentioned above, I consider this very unlikely. I would suggest that a powerful image came to him in a dream -- for instance, a well-dressed physician turning into a monster (not an uncommon sort of nightmare image) and he then proceeded to fill in the details and write *Dr. Jekyll and Mr. Hyde* using his well-developed novelistic skills.

I believe that poems too often have a powerful Central Image. In fact what T.S. Eliot has called the "objective correlative" of a poem is strikingly similar to what we have called the

Central Image of a dream. For instance, consider the image that Eliot himself cites, when discussing the objective correlative, from his poem “The Love Song of J. Alfred Prufrock” [22]:

*“I should have been a pair of ragged claws
Scuttling across the floors of silent seas.”*

This powerful image, occurring starkly in the middle of the poem, pictures the social shyness of the narrator who feels uncomfortable with the women who “come and go speaking of a Michelangelo.” Here the image obviously pictures an emotional state or emotional concern as occurs in dreaming [13, 14].

In this sense the dream is actually similar to a poem or other work of art, although of course the dream seldom produces a complete work but rather the beginnings of a work of art. As is well known, the new connections in dreams can also help to produce new works of art (and of science). Numerous examples are cited in Barrett, *The Committee of Sleep* [23]. Of course this only happens when the mind is prepared, and I would add that the problem must be an emotional concern of the dreamer. Elias Howe, who had a dream that led to the design of the sewing machine, had been trying for a long time to invent a workable model, so the problem was immensely important to him.

Some may consider this discussion of a dream related to a work of art as somewhat far-fetched. But we arrive at a similar conclusion about the dream as a creative product if we start by examining the development of dreaming in childhood. David Foulkes has done the only careful laboratory-based study on the development of dreaming in childhood [24, 25]. His somewhat surprising conclusion is that mature dreaming involving the dreamer’s self, other characters, interactions between people, etc. develops only slowly between the ages of five and ten. In summarizing his work he notes that dreaming develops in children along with the development

of active imagination and storytelling. He concludes: “dreaming is not at all a form of perception, or ‘passive seeing.’ It is active imagining,” which is a separate function that develops slowly over the years of childhood [reference 24, p. 281]. “Dreaming is a creative recombination of memories and knowledge, Dreaming is not simple replay of global units from our past experience” (p. 293). Thus, starting with the development of dreaming in childhood leads to the same conclusion: that dreaming is a creative product.

Implications for the Functions of Dreaming

As of now the functions of dreaming are unknown. This is not surprising since we do not even know the functions of sleep with certainty. However, I believe the creative connection making of dreams we have discussed above does lead to a possible functional role. I suggest that dreaming has a function and that it involves weaving in new material -- combining of new material with what is already present in memory stores in the cortex, always guided by emotion. Emotion tells us what is important to us. In other words I suggest that the emotion-guided making of connections not only produces the dream image but also integrates and updates our memory systems in the cortex.

I want to make it clear that I am not speaking of memory consolidation, a process well studied in animals, referring to the ease of recall of specific memories. It is quite possible that sleep, among its functions, does play a role in memory consolidation. The studies that we have referred to above showing replay of waking patterns in hippocampal neurons during sleep may be relevant to this role [1, 2]. But I suggest that dreaming, which is a form of mental functioning -- basically meaning cerebral cortical functioning -- probably has a function relating to

integration of memory. I have referred to this as a weaving together of old and new memories, and the building of memory systems guided by emotion.

There is no direct experimental proof for this (nor of any function of dreaming), but I believe we can see this integration happening, on a clinical level, if we follow long series of dreams. We can follow it most clearly after an acute traumatic event, when we are able to obtain a long series of dreams following the event, and a series of dreams before the event as well, for comparison. I have collected a number of long dream series of this kind. Here is what happens: the first dreams after the trauma sometimes directly portray bits of the actual events, but usually with changes as noted. Then the emotion (especially fear, vulnerability) is often pictured in a powerful dream such as the tidal wave dream [6, 13], and then a whole series of combinations occur in which dreams appear to be connecting memories of the actual trauma, metaphoric pictures of the emotion, and pictures of similar past traumas or other related events that have some emotional relationship to the new one. Then, usually after a few months, the dreams gradually return to the pattern they had before the traumatic event.

For instance, here is a case of a definite but relatively mild trauma. A sensitive boy, fourteen years old, on a trip with his parents, was inadvertently locked into a hotel room for a day and a half. Apparently, there was no phone and no one heard him when he yelled and pounded on the doors and walls. He became extremely upset for a time before he was finally “rescued.” He summarizes what happened over the next months:

I then had many dreams and nightmares about this event. I was always locked in, enclosed or trapped in some way but the dreams gradually changed.

Sometimes I was trapped in a room like the actual one, sometimes in a very different situation. I also dreamt of being caught in a fire and of drowning in a

tidal wave. Sometimes my parents were there, sometimes scenes from my childhood – scenes involving being caught or trapped -- entered into the dreams. My dreams were playing with the theme of my being trapped in a room and bringing in all kinds of related stuff from my life, from stories I'd read and from my imaginings.

He says it took four or five months for his dreams to gradually finish dealing with the traumatic event, and to return to the themes they had before the incident.

Here's a situation involving a more severe trauma. This was a thirty-year-old man who lived in Oklahoma City at the time of the Federal Building bombing in 1995. One of his friends died in the bombing.

He was a good dream recaller who wrote down his dreams and was willing to share about 200 consecutive dreams occurring before, and for a year after, the bombing. Before the date of the bombing he had a lot of dreams involving his work and his friends, and a few nightmares as well. On the day of the bombing his sleep and his dreams changed drastically. For a few nights he slept poorly and couldn't remember dreaming at all. Then for a few days he had brief dreams of simply driving to the Federal Building and sitting there in his car. Then he had similar dreams that included his driving there and looking around, noticing that the streets were empty; he was the only one there. He saw the scene very powerfully and vividly, but nothing more happened. In one dream he drove to the building, opened his car door and got out. In one dream there were other people there, and a friend opened the car door for him. Then a powerful dream of a large stadium. A police helicopter dropped a man – apparently the chief suspect in the bombing – into the stadium, and the whole crowd, all 85,000 or so, went after him to kill him. Then some dreams of himself in an auditorium, feeling very uncomfortable. He was being grilled –

questioned – by people up on the podium. Then dreams of being chased by gangsters, and especially of a friend being hurt by gangsters. Dreams of a Ryder truck, the same kind used in the bombing, coming to his house. Dreams of storm clouds, violent whirlwinds, many kinds of danger. Dreams of fighting. Dreams that incorporated fights and conflicts from his childhood along with recent scenes related to the bombing. Almost all the dreams had very powerful images, usually images involving danger. Many of the dreams clearly pictured his emotions including especially terror, vulnerability and anger.

Only very gradually, about five to eight months after the bombing, did the violent themes start to subside. His dreams gradually calmed down, with more dreams of friends and girlfriends, concerns about his work etc., and with less powerful images. (All his dreams were actually scored for Central Images [6]. The intensity scores were very high in the months after the bombing, and then gradually decreased back to their pre-bombing levels over the subsequent year.)

So, in these cases involving a single traumatic event, one can trace a gradual “playing with” and “weaving in” of new traumatic material. I suggest that this happens all the time, but is harder to follow when there is no single “marker” event, such as an acute trauma.

I suggest, though I cannot prove, that this connecting and combining process after trauma can be useful (adaptive) in several related ways. First of all, once these connections are made the material is not so frightening. The dreamer no longer feels “this is the most horrible thing that has ever happened to anyone, how can I survive this?” but rather notes that this experience is somewhat like... is not too different from..., “reminds me of ...” This may be useful in itself and in addition the connections between such traumatic events and the existing memory stores will

be useful in making a new trauma less distressing if it should happen again, or if something similar should happen.

This is an example of the suggested functions of dreaming in integrating new experience into memory, guided by emotion. This structuring of our memories along emotional lines is what makes up our personal sense of meaning and sense of self as has been noted by a number of thinkers, for instance Rapaport [26] and Modell [27] starting from their own frames of reference. In this sense I suggest that dreaming plays a role in what we can call the creation of personal meaning and a sense of self.

The Contemporary Theory of Dreaming

Our discussion of dreaming above fits closely into what has been called the Contemporary Theory of Dreaming [15, 28]:

- 1) Dreaming is a form of mental functioning. It is not an alien intrusion, not material in a foreign language, and not separable from our other mental functioning. It is one end of a continuum of mental functioning (which means chiefly cerebral cortical functioning) running from focused waking thought at one end, through reverie, daydreaming, and fantasy to dreaming at the other end.
- 2) Dreaming is hyperconnective. At the dreaming end of the continuum connections are made more easily than in waking, and connections are made more broadly and loosely. Dreaming avoids tightly structured, over-learned material. We do not dream of the three *R*'s. Dreaming always involves new connections: dreaming is creation, not replay.

- 3) The connections are not made randomly. They are guided by the emotions of the dreamer. The dream, and especially the Central Image of the dream, pictures or expresses the dreamer's emotion or emotional concerns. The more powerful the emotion, the more powerful (intense) is the Central Image.
- 4) The form or "language" of dreams is mainly picture-metaphor. But this is not a language restricted to dreaming. It's the way things are expressed towards the right-hand end of the continuum. At this end of the continuum there is less serial processing, less task-orientation, less functioning by formal rules, less constraint. The system "relaxes" into a default mode, functioning by similarity (metaphor), rather than formal rules, guided by whatever emotions or emotional concerns are present.
- 5) Functions of Dreaming. This making of broad connections guided by emotion has an adaptive function, which we conceptualize as "weaving in" new material – taking new experiences and gradually connecting them, integrating them, into existing memory systems. In other words, the dream helps us to build and rebuild a meaningful emotional memory system, which is the basis of our individual selves. This primary function occurs whether or not a dream is remembered. When a dream is remembered, the broad connections can also be adaptive in increasing self-knowledge, and producing new insights and creations.
- 6) Function of the continuum. In addition to the functions of dreaming (above), the entire focused waking-to-dreaming continuum has an adaptive function. It is obviously useful for us to be able to think in direct, focused, serial fashion at certain times, and at other times to associate more broadly, and loosely – in other words to daydream and to dream.

Using dreams in therapy and in self-knowledge

Finally, I believe that our discussion of dreams as creative products always making new connections has implications for our use of dreams in therapy and in getting to know ourselves. Based on what we have discussed above and a great deal of other work on dreaming [14, 28], I believe that no complete “translation” of a dream is possible. The dream is a creative part of our mental functioning, but it is not neatly translatable into our waking thoughts or waking language. I cannot agree with Freud’s view of the dream as only a “manifest dream” which can be completely translated into a group of underlying thoughts (the “latent dream”). We can indeed work on a dream and free associate to the elements in the dream. Underlying thoughts and especially underlying emotional concerns usually emerge. Discussion of the underlying “latent” thoughts can definitely contribute to our understanding, but in my view we can no more substitute the latent thoughts for the dream than we can substitute a critic’s explanation of a work of art for the work of art itself.

I suggest that probably all we can usefully do is get to the “gist” of the dream. Getting the “gist” involves appreciating the dream as a whole, looking at the connections to see if there is anything new or surprising, and examining the Central Image, to help identify the underlying emotion and concerns. Most often, that is all we can do with certainty, in terms of understanding the dream and perhaps it is all we should do.

Of course we need not stop there. When we have a truly impressive dream, a “big” dream, it can be so striking that it calls out for attention – though not necessarily “interpretation.” In fact interpretation may be the wrong approach. Interpretation emphasizes finding a meaning, a “latent dream” under the dream and more or less substituting that for the dream. Of course

dreaming is meaningful, as is thought, fantasy, daydreaming, and artistic creation. But there is not a single meaning to be “extracted.” I suggest that rather than translating the dream, we can appreciate it, we can admire it, we can learn from it.

Important Points:

Every dream makes new connections.

The dream is a creative product, not a replay of waking material.

The connections in dreaming are not made randomly; they are guided by the emotions of the dreamer.

Dreaming may have a function in integrating new with old memories, guided by emotion. This is very different from memory consolidation.

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