

The synthesis of dream sources

Commentary on “The continuity and discontinuity between waking and dreaming: A Dialogue between Michael Schredl and Allan Hobson concerning the adequacy and completeness of these notions”

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The dialogue between Michael Schredl and Allan Hobson in the target article, once again peaked my interest in the continuity question. I've always wondered about the sometimes-obvious carryover of wake life events into dream life, and the reverse, carryover of dream feelings into wake life as implied in the study cited by Schredl & Reinhard (2009-2010). I've also wondered what new insights I might gain about dreaming by studying this question. Intuitively I've felt that much can be learned about dreaming by paying attention to the differences between the wake and dream state. Or, as Hobson asks, which is the more important for understanding the brain basis of dreams, the continuity principle or the reasons for the discontinuity of dreams? At the end of the article, the authors agree that both the continuity and discontinuity of dreams can teach us about dreaming. I agree, but I feel we can learn more about dreaming from its discontinuity with wake life events.

I hope to show in this Commentary on the target article that the discontinuity hypothesis Hobson talks about arises because of a self-organizing process. By means of a self-organizing process, a dream is synthesized from on-going mental activity such as people, places, thoughts and feelings that arise in the mind of the dreamer. These may come from daytime concerns or simply from on-going mind wandering.

Though many of my dreams exhibit wake life concerns, and support the continuity hypothesis, others do not. A recent dream of mine seemed to just come out of the blue having little continuity with my wake life. The dream is:

I'm observing with amazement and awe the flight antics in the sky. I see a small sleek aerodynamic delta winged plane shoot out from the nose of a larger jet plane. Someone says to the pilot of the small plane to dip down first before he starts to climb skywards, which he does. I see this maneuver and am astonished at the speed and maneuverability of the delta winged aircraft. After this, the smaller delta winged plane flies into the larger craft as part of its maneuvers. The speed of the plane excites and astonishes me. I also see that the pilot of the incredibly fast delta winged airplane has his arms extended out of the nose of the plane as if he was directing the maneuvers of the plane with his extended arms. I think to myself and say to someone nearby that this is very interesting, that even though the plane is certainly controlled by instru-

ments like a throttle on the plane, the pilot instinctively is guiding the plane by extending his arms in the direction he wants the plane to go. I think that we must be wired to use our bodies to direct our movements even when we know this is impossible.

This dream does not reflect continuity between my wake life experiences; the dream can best be explained by a synthesis of dream sources by self-organization. Some examples of structures that emerge through a self-organizing process that hardly resemble the source elements are ice crystals, traffic flow patterns, bacterial culture patterns, pattern of flying geese, pattern of schools of fish, termite nest architecture and fire ant rafts. Each of these emergent structures could not have been predicted by studying their source elements, namely, water, individual cars, individual bacteria, geese, fish, termites and fire ants, respectively. In each case self-organization will occur under conditions that cause individual source elements to organize into a structure that did not exist before. In the case of the formation of ice crystals, temperature is one of the conditions that influence water molecules to become organized into ice crystals; for traffic flow patterns to form, the density of cars must exceed a threshold density; a threshold density of bacteria, geese, fish, termites and ants is also one of the requirements necessary for the self-organization of bacteria into a culture, geese into a flock, fish into a school, termites to build a termite nest and fire ants to construct a raft out of their own bodies to cross a body of water, all without direction from an architect.

While self-organization is a natural process occurring as we just saw in many aspects of nature (ice crystal formation) and biological wake life (termite and fire ant raft construction, flocks of geese and schools of fish), that it also occurs in dream formation helps explain many interesting aspects of the dream. Some of these aspects include stories that are disjointed, have characters that are out of place and have rooms and buildings that defy architectural possibilities. Despite this, the dream has its own internal logic and structure.

The reason the dream has logic and structure is because the dream is a result of a self-organizing process that is not random. The dream is self-organized from the on-going mental activity whose individual source elements come from the history and imagination of the dreamer.

The self-organized dream as an emergent structure will not only contain something that is entirely different than the parts that made it up, but it may also be beneficial in wake life since it acts as “a practice session for a wide range of wake-state challenges.” As Hobson says “...REM Sleep-Dreaming is a virtual reality generator for the conscious brain-mind. It creates an infinitely varied set of possible

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scenarios... It is important to be prepared for anything. ... Dreaming is thus regarded as a practice session for a wide range of wake-state challenges..." And Kahn and Hobson (2005) suggested that dreaming might prepare us for social interactions, and Revensuo (2000) suggested that dreaming helps us deal with threats in the wake world. And, even if we forget how we met the challenge because we forgot the dream, dreaming consciousness allows the dreamer to experience things he or she could not when awake. These experiences, by themselves, without carryover to the wake world, offer something new. As Hobson puts it dreaming is "...a state to be celebrated and used for its own sake, not a means to an end but an end in itself." For these reasons, the discontinuity of dreaming may not only teach us more about how dreams are formed, but may also be more useful to the individual than the dream's continuity aspects. This is not to minimize the importance of continuity aspects especially when the subject matter of the dream is only tenuously connected to wake events, for then we may be able to uncover continuity between experiences in wake and dream life by examining themes or by thinking in terms of metaphors. For example, if I chose to use a technique from gestalt therapy on the airplane dream quoted previously, I could see what it feels like to be the fast moving highly maneuverable delta winged airplane speeding through the air. Or I could be the pilot with outstretched arms directing my speeding body in the speeding plane. Dream images can thus be used by the wake mind to think about aspects of ourselves, which we may not have thought about, had the dream not occurred, and this is good. However, for learning about dream formation it is important to separate the dreams with obvious continuity with dreams that I have called the 'out of the blue' dreams. Ideally, any theory of dream formation must take both kinds of dreams into account.

We have not yet been able to find a clear brain difference for 'out of the blue' kind of dreams from those that clearly exhibit continuity between wake and dream concerns, feelings, and thoughts. I think there may very well be a brain basis for these different kinds of dreams as has been found for focused thinking versus mind wandering when the default network is active when awake. To do this one would need to take brain images during REM (when there is a good likelihood that dreaming is occurring), wake the dreamer, obtain a dream report, then ask the dreamer whether he or she considered the dream to be out of the blue or reflected continuity with wake life. The researcher would look for differences in the brain images for the two kinds of dreams reported.

In summary, self-organization has two remarkable underlying fundamental properties. One is that an entirely new activity (nest building, raft building by fire ants, for example) will emerge that did not exist before through the cooperative activity of individual builders (termites, fire ants, respectively) under certain conditions (pheromone density and flooding, respectively). The other remarkable fact is that there is no supervisor to direct the building; the nest or raft is built out of the collective interaction of individual members.

In dreaming, both of these fundamental properties of self-organizing systems are evident. The dream has a collective intelligence generated by the interaction of a collection of thoughts, memories of people, places, events and feelings. And the dream emerged without a supervisor directing the action.

Hobson states "Discontinuity is defined as misrepresentations of wake state times, places, persons and actions, and the synthesis of completely original dream features." "...it [dreaming] is autocreative." I agree with this, and, I add that a dream is synthesized from on-going mental activity such as people, places, thoughts and feelings that arise in the mind of the dreamer. The emergent dream is always different than the individual source elements, as is true for any self-organized pattern or emergent structure. And in that we have much to learn that is new when we pay attention to our dreams.

References

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