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Dreaming of Each Other at the Same Time

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An individual intends to call somebody and that somebody calls him/her. Similarly, in sleep, an individual dreams about somebody; and later will find that the same somebody was dreaming about him/her on the same night. There is a Persian idiom that says "hearts channel each other."

Dreaming is a brain activity, and any brain activity comprises different stages that include Stimulation, Processing and Projection. Although any of these steps depends mostly on the individual brain structure, they are structurally similar.

Dreaming and waking thoughts differ in the nature of human drives, and the various ways balance is approached will be explained below. Accordingly, the processing and projection types will be also be different.

For two activities in two separate brains to recall each other in dreams on the same night in their projections, the drives and pathways of activities should meet specific conditions: 1) the daily inputs should have some kind of connection; 2) the two individuals should have strong plasticized memories of each other.

Because the brain is a chaotic medium, unconnected inputs may result in harmonized activities of recalling each other. However, the processing of inputs should combine strong features of 'I" and "the other" to create images of each other in the counterpart mind.

In Section A, I explain the theories and descriptions used in the paper; and in Section B, I give more details of the topic based on these explanations.

A) Introduction to the Applied Theories

Psi-theory

Psi-theory is a specialty in psychology that describes brain activities, governed by a trend toward a homeostatic balance. (Note that this should not be confused with *psi* as related to the paranormal.) Psi-theory describes any brain activity based on the utilization of different types of memories and human drive; either from the body, environment or supressed stresses in brain tissues.

> The Psi-theory describes a cognitive system as a structure consisting of relationships and dependencies that is designed to maintain a homeostatic balance in the face of a dynamic environment.
>
> By integrating motivation and emotion with perception and reasoning, and including grounded neuro-symbolic representations, the Psi contributes significantly to an integrated understanding of the mind. It provides a conceptual framework that highlights the relationships between perception and memory, language and mental representation, reasoning and motivation, emotion and cognition, autonomy and social behavior (Bach, 2006).

The Theory of the Kinematics of Brain Activities

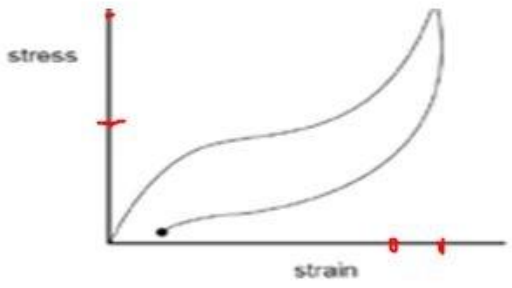
This theory utilizes the same concept as Psi-theory, allocating any feature of a memory to a neural network (of the same level of plasticity for the connections within that network). It is summarized in the following concepts:

1) The way balance is approached is by balancing physical strains when these strains result from stress forces, as a result of drives and conflicts or confirmation introduced during processing.

2) Although the type of balance is a **dynamic balance** – especially during focused waking because of the rush of inputs/outputs in and out of the brain as an open system – it is a **homeostatic balance** in relaxed waking and sleep because of highly limited inputs during sleep.

3) The stress-strain trails are quantized in each neural network, which is a substrate for a memory feature of any type.

4) The brain tissues are viscoelastic materials that relieve stress forces by straining within their linearity range, but store suppressed stress residues in higher stress loads.



A **typical** "stress versus strain" correlation for a brain tissue.

The above curve indicates "stress-strain" changes during waking; The below curve indicates a tissue relaxation in sleep.

A tissue (in a scale of cellular and neural networks) will be suppressed and relaxed between red marks range.

5) Stress forces travel along connected tissues, enabling momentum transfers and resonance between the far networks.

In summary, a brain activity is a composition of an entry of non-stabilized memory of daily life and stabilized memories of the past or their common localized and non-localized features. (For further reading please refer to Dini, 2010, 2012.)

Drives for Brain Activities

There are three types of human drives:

1. Physiological drives (such as food, water, maintenance of physical integrity)
2. Social drives (affiliation).
3. Cognitive drives (reduction of uncertainty, and competence).

The physiological drives enter through the parathalamus and stem interfaces. The social drives enter through sensory associated areas (environment). The cognitive drives are internal and advance by adjusting loop feedbacks to regulate the above mentioned basic drives.
Supressed stresses initiate the dreaming activity; where the suppressed stresses evoke emotions. Supressed stress is the internal drive for a physical stress flow, which converts to "self-talking". In fact, emotion in sleep not only distresses the straight "I-identity" by its expressions and actions, but is also the reason for behaviours and expressions of "other" characters in dreams.

Neural Networks as Sites for Memories

A memory substrate is a set of neural networks connected by a same level of plasticity; and is saved through the topological configuration of neurons and their connections in neural networks (Dini, 2010).

- About 10,000 neural networks are sufficient to save a specific memory or a feature of it, which is called an *engram* (Zaki, 2012). Different areas save different types of memory (cognitive science).
- Memory building is physically a process of synaptic change consolidation (Arshavsky, 2000).
- Some theories explain the location of memories inside neuron cells and in a molecular scale – e.g. DNA configuration (Arshavsky, 2000) – but there is a shift recently from molecular structure to neural networks for encoding memories (Bruel-Jungerman, Davis & Laroche, 2000; Neves, Cook & Bliss, 2008).

- In Kinematics of Brain Activities, it is assumed that molecular structures store the genetic information, and have a catalytic effect on the activity in that location.

The Hypothesis of Non-Localized Memory and its Distribution in Different Areas for Features

A memory is an assembly of several features, which all together create a **hologram of a recalled subject**.

There are different theories about the location of memories. However, in recent studies it is believed that the memory has not just a single location, but the brain becomes active in several areas when remembering. In fact, the local realism and holistic realism distinguish the nature of the brain as a structure of neural networks and the mind as a continuum conducting brain activities (Atmanspacher & Primas, 2003).

The Wave Nature of the Activities in the Brain

Brain activities are periodical wave fluctuations and can be measured by frequency and amplitude of changes in the brain's neural networks' configurations as well as in molecular and cellular functions. The application of quantum theory utilizes the same concept. The distinction between mass and wave domains of material reality in quantum theory describes the distinction between stress flux and straining over brain tissues and consequential duality of the mental domains.

Working Memories Preserve the Continuity of Waking and Sleep Brain Activities

The continuity theory explains that sleep activities are a continuation of waking activity and vice versa (Hartmann, 2011). It seems that working memories are the conjunction media in between. The strain residues in neural networks support working memories. They last for seconds to hours and sometimes for days.

Dreaming is a Brain Activity that Seeks to Approach a Homeostatic Strain Balance

> Jung believed that memories formed throughout the day play a role in dreaming. These memories leave impressions for the unconscious to deal with when the ego is at rest. The unconscious mind re-enacts these glimpses of the past in the form of a dream. Jung called this a day residue. (Jung, 1969).

The streams of stress flow in brain circuits during daily activities leave some supressed stresses. These remain as a potential to relieve during sleep to approach a homeostatic balance over the brain layers. The distribution of the strain residues will cross neural networks, which hold memory features and, by crossing, activate them. The recollection of these accidentally activated features creates characters, behaviours and scenes in the narrative of the dream.
Indeed, that is the brain, which tends to release itself from strains and interact by distributing the suppressed stress.

Consciousness in Sleep ("I" and the "Other" in Dreams)

Consciousness and high activity in the center of the brain in an area called fusiform gyrus are very closely connected (*Consciousness Redux*. Scientific American Mind; May/June 2014).
In sleep, the activity in this part of the brain is even higher than in waking, during vivid dreams in particular.

> Fusiform connectivity was substantially greater during sleep stage 1 than in wake . . . (van Dongen, et. al., 2011).

Distinguishing between "I" and "other" in dreams is presented through an awareness of the recalled memories and their features. "I" is principally located in the memory substrates of inner areas; and the "other" generally has more roots in sensory associated areas and outer layers. Any feature of the "other," such as its behaviours and characteristics, can favor or be against the "I" attitude, which evokes a feeling (stress force). The relationship between "I" and "other" is known by that **feeling**.

The dream narrative is an emotional dialogue of conflicts between inner brain (subconscious "I") with outer brain (the "other"; or conscious part of "I").

Most Popular Definitions of Dreams Regarding the "I" Character

There are different definitions for dreams, but in the majority, "I" is the subject, as in the following:

> Dreams are seen as projections of parts of the self that have been ignored, rejected, or suppressed. (Wegner, Wenzlaff & Kozak, 2004).

Accordingly, any character in the dream represents an aspect of the dreamer, And "dream" is the internal projection of the conflicts in the "self-thought" or "self-talk"; a dialogue between the outer and inner brains.

"If we are away, still we have each other in mind"
Daisy Goodwin, published in the Sunday Times, 29 August 2010.

B) Dreaming About Each Other at the Same Time

According to the above definitions, the "other" is a part of "I" located in the outer brain that reflects one or several experiences that "I" has had. The story of those conflicts remains as a random grouping of features in dreams.

I) Activity Stimulation (initiation):

A common stimulation occurs when two individuals are exposed to a common input. An example is when the "other" has a birthday, and it is recalled by the "I" during the same day. To be an effective stimulus, there must be a sufficiently powerful common input for both parties, such as a news story that affects both of them; or a story or event that recalls specific features or related motifs (and their associated feelings) that have their counterparts in character images.

II) Activity Processing (occurrence):

A "self-talk" dialogue starts though the interaction of memories with daily life events. The theme of the dialogue reflects either daily, on-going or long term issues in life. The characteristics of the dialogues are created from a collection of the activated features in any given scenario. Now two people are going to have dreams about each other in the same night. The dialogue is dictated by a physical "convergence in time." The dialogue activity occurs whenever there is:

1. A convergence in time*: when an input (a hormone or sensory input) stimulates neural networks in a common circuit from the past or from a recent waking time. The essential parameter for this condition is the same frequency of excitation in all mentioned times.

   The **time** parameter (in environment) will convert to **frequency** in the brain domain. Now, if the two feeling currents in the two separate brains find the same or multiple frequencies and the two feeling waves find a **lock-in-phase condition**, the **convergence in time** for the two events is available.

2. A convergence in space *: the same circuit or trail of memories, which have been activated in the past and in a recent daily life event, are activated in sleep.

3. A convergence in continuum: further to convergence in time and location (space), a governing parameter like emotion places the images in order. The governing emotion in "dream" should be similar to the emotions experienced in the past and recent daily life. Emotion is an emergent property for the modulation of perception, behaviour and

cognitive processing, producing the characters and their actions in dream as well as the background scene.

*** *Splintered by Stress*. Scientific American Mind; Sept/Oct 2011.**

III) Elements of 'I' and "other" in projection:

The "I" identity is a cloud of subconscious features, which represent unfulfilled and over-fulfilled wishes. It is very flexible and reflects the suppressed need, desire or goal.

A combination of features which explain the above brings up an image of "I"; and a synthesis of all corresponding features that oppose or support those points, create the image of the "other."

Summary

To have simultaneous brain activities in A's brain and B's brain to recall each other, it requires that three different **conditions** are available:

1) specific inputs **available** to initiate the activities (a convergence in time for the two events of activities in their brain); **2)** the energy of each input can **overcome** the minimum required energy for the activity initiation (strong input); **3)** specific **pathways** are activated in both brains to converge to project the A-relevant features in B's brain and the B-relevant features in A's brain. Projections (perceptions and cognitions) in chaotic media like the brain are **sensitive to inputs**, depending on the **plasticity of** the neurons on the pathway.

The specific input that can initiate connected simultaneous activities in both brains is either **1)** a **common global input** which both brains are exposed to and maintain the **convergence of time** for both separate activities to occur; or **2)** any **other accidental inputs** that initiate and converge the recalls of A in B's brain and B in A's brain.

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