A LINE ON LIFE 11/12/95 What Dreams Reveal * David A. Gershaw, Ph.D.

In 1913, Sigmund Freud viewed dreams as the "*royal road to the unconscious*." They were seen as expressions of our deepest desires and fears. In 1995, Robert Stickgold, a Harvard University psychologist, uses physiological data and dream narrative research to formulate another explanation for dreams.



Dreams were typically explored by waking people up and having them describe their dreams. More recently, researchers have been able to relate dreaming to changes in the physiology of the brain. Most dreaming occurs during **rapid-eye-movement (REM)** sleep. (The rapid eye movements indicate that dreamers are surveying their dream scene.) If woken from non-REM sleep, sleepers report "*dull, nonproductive thoughts*," while REM sleep is followed by "*vivid, narrative, and highly sensory*" thoughts. In contrast to being awake, dream events are improbable or bizarre. Even so, they are likely to be believed by the dreamer. As most of us know, abrupt and weird shifts are relatively common in dreams.

Recently, changes in the brain have been found to match these thought patterns. While we are awake, our **brain stem** (the top part of the spinal cord) bathes our **cerebral cortex** (the part of the brain where our higher thinking occurs) with a particular neurotransmitter – **noradrenaline**. Not only does noradrenaline "*wake up*" our thinking centers, it also blocks out other areas. Essentially, it blocks out the "*static*" in brain signals, so we can concentrate on the tasks at hand.

When we go into non-REM sleep, essentially the brain "*shifts into neutral*." The brain stem provides very little stimulation for the cortex. However, in REM sleep, instead of noradrenaline, the brain stem produces another neurotransmitter – acetylcholine. Acetylcholine activates the brain more diffusely. Beside waking up the cerebral cortex, it also triggers responses in visual and motor areas and centers that activate emotions. This produces a jumble of random input such as images and emotions. Activated by the acetylcholine, the higher thinking centers try to make sense of what is happening. Associations are formed between these stimuli to try to develop a sensible narrative. As different areas stimulate the cerebral cortex, the plot or the scene may change too.

To examine how the brain associates stimuli, Stickgold used a word-priming task. Subjects view a series of paired words on a computer screen in sequence. They are supposed to indicate if the second is a real word ("cat") or not ("cav"). If the first word is related to the second ("dog-cat"), subjects indicate it is a real word more quickly than if the pair of words are not related ("mop-cat"). This indicates that the first word is priming the second. With this priming effect, specific brain centers are activated, making it easier to form specific associations.

Stickgold's research indicated that the priming effect was stronger during particular times of the day. Priming is very low just before bedtime and essentially nonexistent in non-REM sleep. In contrast, priming peaks just after waking and during REM sleep.

This indicates that association networks are very active during REM sleep – when dreaming occurs.

Stickgold suggests that random emotions and sensory stimulation push the brain to create a story - a dream. Because acetylcholine is not selective in the areas that it stimulates, the cerebral cortex receives varied and unclear information from many areas. This causes bizarre jumps in dream scenes and plots. Stickgold looks upon dreams as being created from bottom-up thinking processes. The brain does its best to combine the random stimuli it receives in some way, so they make sense. According to Stickgold, dreams "*have no author*." They are only the brain's way of creating a fantastic story line, trying to keep up with a chaotic jumble of images and feelings. He summarizes, "...*there is no intentional meaning in dreams*."

On the other hand, even Stickgold indicates that these random stimuli are associated with each individual's memories and experiences. Even when awake, our perceptions are influenced by our **frame of reference** – our individual viewpoint of the world based on the total interaction of our past experiences. Our frame of reference is like a window frame – it *primes* us. Like a window for viewing the world, it allows us to see some things through the glass very clearly, while the frame itself blocks other things from our awareness. In this way, while we are sleeping, all the associations, characters and plots develop meanings that are very personal to the dreamer. If the dreamer has specific desires or fears, the random stimuli can be associated with these significant emotions, presenting them as content in dreams.

Stickgold and other researchers are becoming more aware of the brain mechanisms that underlie our behavior. Even so, these discoveries do not necessarily contradict previous psychological theories. The dreams may not be your "*unconscious*" trying to communicate to you. However, if you can analyze how you combine random stimuli into your dreams, this may give you clues to previously undiscovered parts of yourself.

* Abstracted from Beth Azar's article, "Dreams don't house a hidden meaning," in the <u>APA Monitor</u>, October, 1995, page 30.