## States of Consciousness: Sleeping and Dreaming

The lives of all organisms, including humans, are influenced by *regularly occurring cycles of behaviors* known as biological rhythms. One important biological rhythm is the annual cycle that guides the migration of birds and the hibernation of bears. Women also experience a 28-day cycle that guides their fertility and menstruation. But perhaps the strongest and most important biorhythm is the daily circadian rhythm (from the Latin *circa*, meaning "about" or "approximately," and *dian*, meaning "daily") *that guides the daily waking and sleeping cycle in many animals*. Many biological rhythms are coordinated by changes in the level and duration of ambient light, for instance, as winter turns into summer and as night turns into day. In some animals, such as birds, the pineal gland in the brain is directly sensitive to light and its activation influences behavior, such as mating and annual migrations. Light also has a profound effect on humans. We are more likely to experience depression during the dark winter months than during the lighter summer months, an experience known as *seasonal affective disorder (SAD)*, and exposure to bright lights can help reduce this depression .

Sleep is also influenced by ambient light. In addition to sending visual information to the thalamus, the ganglion cells in the retina send signals to the *suprachiasmatic nucleus* (SCN) of the hypothalamus, located below the thalamus. The suprachiasmatic nucleus is the body's primary circadian "pacemaker" and contains cells that analyze the strength and duration of the light stimulus and send signals to the pineal gland when the ambient light level is low or its duration is short. In response, the pineal gland secretes *melatonin*, a powerful hormone that facilitates the onset of sleep.

### Sleep Stages: Moving Through the Night

Although we lose consciousness as we sleep, the brain nevertheless remains active. The patterns of sleep have been tracked in thousands of research participants who have spent nights sleeping in research labs while their brain waves were recorded by monitors, such as an *electroencephalogram*, or *EEG*.

Sleep researchers have found that sleeping people undergo a fairly consistent pattern of sleep stages, each lasting about 90 minutes. As you can see in Figure , these stages are of two major types: Rapid eye movement (REM) sleep is *a sleep stage characterized by the presence of quick fast eye movements and dreaming*. REM sleep accounts for about 25% of our total sleep time. During REM sleep, our awareness of external events is dramatically reduced, and consciousness is dominated primarily by internally generated images and a lack of overt thinking. During this sleep stage our muscles shut down, and this is probably a good thing as it protects us from hurting ourselves or trying to act out the scenes that are playing in our dreams. The second major sleep type, non-rapid eye movement (non-REM) sleep is *a deep sleep, characterized by very slow brain waves, that is further subdivided into three stages: N1, N2, and N3*. Each of the sleep stages has its own distinct pattern of brain activity.

The brain waves that are recorded by an EEG as we sleep show that the brain's activity changes during each stage of sleeping. When we are awake, our brain activity is characterized by the presence of very fast *beta waves*. When we first begin to fall asleep, the waves get longer (*alpha waves*), and as we move into stage N1 sleep, which is characterized by the experience of drowsiness, the brain begins to produce even slower *theta waves*. During stage N1 sleep, some muscle tone is lost, as well as most awareness of the environment. Some people may experience sudden jerks or twitches and even vivid hallucinations during this initial stage of sleep. Normally, if we are allowed to keep sleeping, we will move from stage N1 to stage N2 sleep. During stage N2, muscular activity is further decreased and conscious awareness of the environment is lost. This stage typically represents about half of the total sleep time in normal adults. Stage N2 sleep is characterized by theta waves interspersed with bursts of rapid brain activity known as *sleep spindles*. Stage N3, also known as *slow wave sleep,* is the deepest level of sleep, characterized by an increased proportion of very slow *delta waves*. This is the stage in which most sleep abnormalities, such as sleepwalking, sleeptalking, nightmares, and bed-wetting occur. The sleepwalking murders committed by Mr. Parks would have occurred in this stage. Some skeletal muscle tone remains, making it possible for affected individuals to rise from their beds and engage in sometimes very complex behaviors, but consciousness is distant. Even in the deepest sleep, however, we are still aware of the external world. If smoke enters the room or if we hear the cry of a baby

we are likely to react, even though we are sound asleep. These occurrences again demonstrate the extent to which we process information outside consciousness.

After falling initially into a very deep sleep, the brain begins to become more active again, and we normally move into the first period of REM sleep about 90 minutes after falling asleep. REM sleep is accompanied by an increase in heart rate, facial twitches, and the repeated rapid eye movements that give this stage its name. People who are awakened during REM sleep almost always report that they were dreaming, while those awakened in other stages of sleep report dreams much less often. REM sleep is also emotional sleep. Activity in the limbic system, including the amygdala, is increased during REM sleep, and the genitals become aroused, even if the content of the dreams we are having is not sexual. A typical 25-year-old man may have an erection nearly half of the night, and the common "morning erection" is left over from the last REM period before waking. Normally we will go through several cycles of REM and non-REM sleep each night. The length of the REM portion of the cycle tends to increase through the night, from about 5 to 10 minutes early in the night to 15 to 20 minutes shortly before awakening in the morning. Dreams also tend to become more elaborate and vivid as the night goes on. Eventually, as the sleep cycle finishes, the brain resumes its faster alpha and beta waves and we awake, normally refreshed.

**Dreams and Dreaming**

Dreams are *the succession of images, thoughts, sounds, and emotions that passes through our minds while sleeping*. When people are awakened from REM sleep, they normally report that they have been dreaming, suggesting that people normally dream several times a night but that most dreams are forgotten on awakening. The content of our dreams generally relates to our everyday experiences and concerns, and frequently our fears and failures.

Many cultures regard dreams as having great significance for the dreamer, either by revealing something important about the dreamer's present circumstances or predicting his future. The Austrian psychologist Sigmund Freud (1913/1988) analyzed the dreams of his patients to help him understand their unconscious needs and desires, and psychotherapists still make use of this technique today. Freud believed that the primary function of dreams was *wish fulfillment*, or the idea that dreaming allows us to act out the desires that we must repress during the day. He differentiated between the *manifest content* of the dream (i.e., its literal actions) and its *latent content* (i.e., the hidden psychological meaning of the dream). Freud believed that the real meaning of dreams is often suppressed by the unconscious mind in order to protect the individual from thoughts and feelings that are hard to cope with. By uncovering the real meaning of dreams through *psychoanalysis*, Freud believed that people could better understand their problems and resolve the issues that create difficulties in their lives.

Although Freud and others have focused on the meaning of dreams, other theories about the causes of dreams are less concerned with their content. One possibility is that we dream primarily to help with consolidation, or the moving of information into long-term memory. Rauchs, Desgranges, Foret, and Eustache (2005) found that rats that had been deprived of REM sleep after learning a new task were less able to perform the task again later than were rats that had been allowed to dream, and these differences were greater on tasks that involved learning unusual information or developing new behaviors. Payne and Nadel (2004) argued that the content of dreams is the result of consolidation—we dream about the things that are being moved into long-term memory. Thus dreaming may be an important part of the learning that we do while sleeping.

The *activation-synthesis theory* of dreaming proposes still another explanation for dreaming—namely, that dreams are our brain's interpretation of the random firing of neurons in the brain stem. According to this approach, the signals from the brain stem are sent to the cortex, just as they are when we are awake, but because the pathways from the cortex to skeletal muscles are disconnected during REM sleep, the cortex does not know how to interpret the signals. As a result, the cortex strings the messages together into the coherent stories we experience as dreams.

Although researchers are still trying to determine the exact causes of dreaming, one thing remains clear—we need to dream. If we are deprived of REM sleep, we quickly become less able to engage in the important tasks of everyday life, until we are finally able to dream again.

(Source: socialsci.libretexts.org)

**A. Decide whether the following statements are True or False.**

**1.** Biological rhythms influence the behavior of all living organisms, including humans.
**2.** The annual cycle in birds is unrelated to changes in light exposure. F
**3.** Women experience a roughly 28-day cycle that regulates fertility and menstruation.
**4.** Circadian rhythms are influenced by light levels and duration in the environment.
**5.** The pineal gland in humans directly senses light. F
**6.** Seasonal affective disorder (SAD) is more common during the summer months. F
**7.** The suprachiasmatic nucleus (SCN) acts as the body's primary circadian pacemaker.
**8.** Melatonin secretion is stimulated when ambient light levels are high. F
**9.** REM sleep accounts for about 25% of total sleep time.
**10.** Stage N3 sleep is the deepest stage of non-REM sleep and is associated with sleepwalking and bedwetting.
**11.** Dreams occur exclusively during REM sleep. F
**12.** One function of dreaming may be the consolidation of memories into long-term storage.

**B. Translate the following words in Greek.**

| | | | |
|---|---|---|---|
| 1. biological rhythms | 6. hippocampus | 11. amygdala | 16. drowsiness |
| 2. circadian rhythm | 7. seasonal affective disorder (SAD) | 12. hallucination | 17. fertility |
| 3. pineal gland | 8. memory consolidation | 13. consciousness | 18. depression |
| 4. melatonin | 9. sleep spindle | 14. hibernation | 19. awareness |
| 5. suprachiasmatic nucleus (SCN) | 10. limbic system | 15. secretion | 20. exposure |

**C. Answer the following questions.**

**1.** What are dreams, and what types of experiences do they typically involve?
**2.** According to Freud, what is the primary function of dreams, and how did he differentiate between manifest and latent content?
**3.** How do other theories, such as memory consolidation, explain the purpose of dreaming?
**4.** What did Rauchs et al. (2005) discover about the effects of REM sleep deprivation on rats' learning?
**5.** What does the activation-synthesis theory suggest about how dreams are formed?
**6.** Why is dreaming considered important for humans, according to the text?

**Suggested Answers**

1. Dreams are a succession of images, thoughts, sounds, and emotions that pass through the mind during sleep. They often relate to everyday experiences, concerns, fears, and failures.
2. Freud believed the primary function of dreams was wish fulfillment, allowing the expression of desires repressed during waking life. He distinguished manifest content (the literal storyline of the dream) from latent content (the hidden psychological meaning).
3. Other theories, such as memory consolidation, suggest that dreams help transfer information into long-term memory, aiding learning and skill development.
4. Rauchs et al. found that rats deprived of REM sleep after learning a new task performed worse later than rats that were allowed to dream, particularly on tasks requiring unusual information or new behaviors.
5. The activation-synthesis theory proposes that dreams are the brain's attempt to interpret random signals from the brainstem, forming coherent stories in the cortex while motor pathways are disconnected during REM sleep.
6. Dreaming is important because REM sleep deprivation impairs cognitive and daily functioning, indicating that dreaming plays a crucial role in mental and learning processes.

## Dreams and their relationship to waking life

Fascination with the meaning of dreams goes back millennia. Ancient Egyptians imbued dreams with transcendental meaning and power, and would discuss them with their priests. In the Old Testament, Joseph interprets dreams as prophetic of God's intentions. In Native American culture, dreams are seen as a portal to higher awareness beyond the conscious mind, and hence as a form of life guidance. In the 20th century, Freud proposed that dreams represent unconscious desires or wishes, while Jung suggested that dreams are communications about problems that the conscious mind is unaware of, through the language of archetypal figures and stories. The scientific study of dreams, undertaken from a cognitive perspective since the 1960s, suggests that dreams do indeed have meaning, but in a more quotidian way than the ancients or early psychoanalysts proposed. The 'continuity hypothesis' suggests that dreams often reflect or represent current or recent waking experiences, particularly waking emotions.

**Trauma and nightmares**

Cognitive theorists have quantified the dream world through laboratory-based studies, where participants are woken from different sleep stages throughout the night, reporting any dreams they recall. Independent judges then analyse the content of dreams. One of the most important findings to emerge from this widely used approach was that from 1000 dream reports by the general population, 80 per cent of all reported emotions were negative. Independent studies have similarly found that dream content tends to be negative .

One of the most influential researchers to examine how dreams relate to waking emotions was Ernest Hartmann, who summarised his decades-long research in his 2014 book The nature and functions of dreaming. His research into the dreams of post-traumatic stress disorder (PTSD) and trauma patients led him to propose that dreaming about an emotion experienced in real life allows that emotion to be integrated with similar emotional memories, preparing the dreamer for future experiences of the emotion. Hartmann further argued that the current dominant emotion in waking life is represented in dreams metaphorically through the most striking or compelling central image. The dream then interweaves the dominant emotion with other images and memories that elicit similar emotions, providing a safe context for the emotion to appear and be integrated into memory.

Nightmares of those who have suffered a traumatic event typically include remembered or symbolic images that elicit fear, such as drowning, falling, feeling unable to act as one's house burns, or being chased and unable to get away. Some dreams involve re-experiencing the emotionally traumatic event, or a similar event (for example, a car crash or war trauma).

While these nightmares are no doubt unpleasant, the research programme of Rosalind Cartwright (1991, 2010) suggests that negative dreams following negative events may be conducive to recovery from trauma. People with depression who had negative dreams which pulled together different memories, had improved mood compared to those who didn't have negative dreams. In a study of divorcees, those who were not depressed had more dreams about their ex-spouse than divorcees who showed signs of depression. Cartwright proposed, like Hartmann, that dreams regulate negative emotions by matching them with memories of similar emotions.

The above-mentioned bias to have more negative dreams mirrors the dominance of negative emotion in waking life, where attention is drawn preferably to negative stimuli over positive stimuli. For example, people spend longer looking at negative photographs than positive photographs, and show better recognition memory for negative information over positive information. So, could it be that dreams are predominantly negative because our conscious waking life is drawn to negative stimuli and memories? Have we found the answer that the Ancient Egyptians, Christians, Native Americans and psychoanalysts have sought for so long? Do we now know why we have those vivid night-time experiences and what they mean? More recent dream research using different methodologies has not replicated this negativity bias , suggesting that it may not be so simple.

**Intense waking emotions**

Dream diary methodology typically requires participants to write their dreams into a diary each morning over a 14-day period, as well as waking life events and the emotions attached to them. Unlike in laboratory-based dream methodology, participants write down the dreams they remember in naturalistic conditions without waking up on cue to do so during the night.

In one dream diary study, the emotional intensity of waking life events predicted whether they would be incorporated into dreams, whereas the emotional negativity did not. In another study, waking life events that were incorporated into dreams were more emotional, but not more stressful, than experiences that were not incorporated into dreams. This suggests that it is not negative emotions, but intense emotions of any tone, that are more likely to appear in dreams. The authors argue that dreams may help facilitate mastery and control over affectively arousing memories, but acknowledge that it may simply be easier to recall intensely emotional dreams than less emotional ones.

The emotional assimilation theory of sleep and dreaming proposes that intensely emotional waking life experiences and feelings, whether positive or negative, are activated during sleep and incorporated into dreams via imaginative processes such as metaphor generation and the association of disparate memories. This process serves many functions, including: the incorporation of the intense emotion into the wider memory schema; creativity and insight in relation to emotional challenges; and the amelioration of the intensity of the emotion attached to a specific memory.

So why do some theories point to negative emotions and others to intense emotions when it comes to what determines the content of dreams? This may be down to differing methods of data collection and analysis . There is a clear difference in methodology: earlier studies highlighting the role of negative emotions have principally adopted laboratory-based methods with independent judges of emotion content while studies highlighting intense emotions have primarily adopted home-based self-reported dream diaries. A directed investigation to find out whether this makes a difference showed found that independent judges overestimate negative emotions and underestimate positive emotions compared to self-reports. This suggests that the negativity bias in earlier work is a methodological artefact.

The dreamer's age is also a factor in the incorporation of emotions into dreams, with younger women reporting more negative emotions compared to older women. In our recent research, funded by the BPS Undergraduate Assistantship Scheme, negative waking life emotion was related to negative dream tone in adults under 40, but to dream intensity in those over 40 . These findings, pending replication, suggest that waking emotion is encoded into dreams in different ways according to age.

Older adults also dream less often than younger adults. This could explain why for older adults negative waking life emotion is related to the intensity, but not the negativity, of a dream: for them there might be more emotional material to be processed within a single dream and there might be a larger intervening effect of memory and unconscious processing. Conversely, for younger adults whose negative waking life affect is related to negative dreams, but not intense ones, there might be less material to process at any time and smaller intervening effects. It is as though the emotional language of dreams becomes more disguised as we get older.

**Making dreams conscious**

In summary, we don't yet know with certainty why it is that some dream theories and research studies point towards negative emotions being incorporated in dreams, while other theories and studies conclude that intense emotions end up in our dream life. It is likely that both are true, for both negative and strong feelings create challenges that require processing and integration – and this is certainly a task that dreams are suited to helping with. Furthermore, it may be that as people age, the focus of dreams shifts from negative to intense emotions.

What we can be sure of is that dreams reflect our waking emotional states and help us, at least in part, to process those that have the potential to disturb or disrupt our wellbeing. The imagery of dreams is not some strange and mysterious language that can only be decoded by an expert, but rather a metaphorical or direct representation of what concerns us emotionally in our waking life. To consciously recall and consider our dreams is to indirectly explore our recent negative or intense waking emotions, which may lead our attention to the most salient and important concerns in our lives.

(Source: www.bps.org.uk/psychologist/dreams-and-their-relationship-waking-life)

**A. Answer the following questions.**

1. How did ancient cultures such as the Egyptians, Native Americans, and biblical figures view the meaning of dreams?
2. What was Freud's interpretation of dreams, and how did it differ from Jung's perspective?
3. According to Hartmann, how do dreams help process emotions, particularly in people who have experienced trauma?
4. How do Cartwright's findings suggest that negative dreams may influence recovery from depression or traumatic events?
5. What is the difference between laboratory-based dream research and dream diary studies, and how does this affect findings about negative versus intense emotions in dreams?
6. How does age influence the incorporation of emotions into dreams according to the text?

**Suggested Answers**

1. Ancient Egyptians saw dreams as transcendent and powerful, consulting priests about them; Native Americans considered dreams a portal to higher awareness and guidance; in the Old Testament, Joseph interpreted dreams as prophetic messages from God.

2. Freud proposed that dreams reflect unconscious desires or wishes (wish fulfillment), while Jung suggested that dreams communicate about problems unknown to the conscious mind using archetypal symbols and stories.

3.Hartmann argued that dreaming about emotions experienced in waking life allows the emotions to be integrated with similar emotional memories, preparing the dreamer for future emotional experiences. Dreams use central images to represent dominant emotions metaphorically.

4. Cartwright found that negative dreams following negative experiences could help regulate emotions and support recovery. For example, depressed individuals with negative dreams that integrated various memories showed improved mood.

5. Laboratory-based studies wake participants at night and rely on judges to assess emotions, often showing a negativity bias. Dream diary studies involve naturalistic self-reporting at home, showing that intense emotions (not necessarily negative) are more likely incorporated, highlighting methodological effects on results.

6. Younger adults tend to have dreams more directly reflecting negative waking emotions, while older adults' dreams incorporate emotions more intensely rather than negatively. Older adults also dream less frequently, and emotional material may be more consolidated within single dreams.

**B. Decide whether the following statements are True or False.**

**1.** Ancient Egyptians considered dreams to have spiritual or transcendental significance.

**2.** Freud believed dreams primarily reveal conscious desires that people are aware of. F

**3.** Jung suggested that dreams communicate about problems unknown to the conscious mind using archetypal symbols.

**4.** The 'continuity hypothesis' proposes that dreams reflect recent waking experiences, especially emotions.

**5.** Hartmann argued that dreams about emotions experienced in real life help integrate these emotions into memory.

**6.** Cartwright's research found that negative dreams after negative events always worsen mood and impede recovery. F

**7.** Laboratory-based dream studies often report a bias toward negative emotions due to the method of independent judges.

**8.** Dream diary studies suggest that intense emotions of any tone, rather than specifically negative emotions, are more likely to appear in dreams.

**9.** Older adults incorporate emotions into dreams in the same way as younger adults, with no difference in intensity or negativity. F

**10.** The text concludes that dreams reflect waking emotional states and help us process emotions that could disrupt our wellbeing.