

Scientific Research

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READING 1

“Science and Technology: Learning in Your Sleep,” 20 June 2002, in *Economist.com* (www.economist.com/).

-- Discussion of Reading 1 -----

1. What are the two competing theories about why sleep is good for the memory? (One theory says that sleep is when permanent memories form. The other says that they are actually formed during the day, but then edited at night, to flush away what is redundant.)
2. During which stage of sleep do people relive the events of the previous day in dreams? (during rapid eye movement [REM] sleep)
3. Describe Dr. Pierre Maquet’s experiment using positron-emission tomography (PET). (Dr. Maquet used PET to study the brains of people as they practiced a task during the day, and as they slept during the following night. They pressed a button as fast as possible in response to a light coming on in one of six positions. As they learned to do this, their response time got faster. The appearance of the lights sometimes followed a pattern, and they learned faster when the pattern was present than when it was not.)
4. What did the PET scans reveal about the grammar-learners and the people exposed to the random pattern? (The PET scans revealed

that the cuneus was active during both the four-hour training period and subsequent REM sleep, but not in any other stage of sleep. The scans revealed less activity in the cuneus during REM sleep in those who had seen randomly flashing lights than in those who had learned the artificial grammar.)

5. What conclusion did the research team reach? (Those with more to learn [i.e., the artificial grammar as well as the mechanical task of pushing the button] have more active brains. The team concluded that the neural connections involved in memory are reinforced through reactivation during REM sleep, particularly if the brain detects an intrinsic structure in the material being learned.)
6. Write a one-sentence statement in your own words of the main idea of the article. (Dr. Pierre Maquet's study of the human brain showed that learning a patterned task rather than a random task resulted in more brain activity when the subjects were asleep, which proved that memory is reinforced through reactivation during REM sleep.)

READING 2

“Workaholics Kiss Goodnight to Sleep,” 7 October 2002, in BBC News World Edition (www.bbc.co.uk/).

-- Discussion of Reading 2 -----

1. What problem do many United Kingdom (UK) employees have because of pressures from work? (The pressures of 24-seven society are forcing individuals to squeeze more working time out of their day from their bedrooms. Hard-pressed staff are surviving on less than the recommended eight hours sleep a night, as a result.)
2. According to a DuPont survey, where do many British people catch up on their work? (One in six people taking part in the DuPont survey admitted they catch up on work in bed and a third said they make work-related phone calls from under the duvet.)

3. What can result from sleep deprivation? (Changing sleep cycles can damage people's health. Research suggests that sleep deprivation doubles the risk of a heart attack.)
4. Why is an average of six hours of sleep a night not enough? (Research suggests that people who slept six hours a night were suffering from the effects of sleep deprivation. Performance declines. The brain can't process a lot of information continuously.)
5. Why is the quality of sleep important? (If you don't get adequate sleep, there are consequences for health in later life.)
6. What advice does Dr. Peter Venn give about sleep? (He suggested preparing for sleep properly, using hot milky drinks as a sedative, and sleeping alone, but if you sleep with a partner, use separate duvets to minimize the disturbance created by the other person's movement.)
7. How many hours of sleep each night do you get on average?
8. Do you have trouble falling asleep or sleeping through the night?

READING 3

Marcia Hill Gossard. "Taking Control," *Newsweek*, 15 July 2002, 47.

-- Discussion of Reading 3 -----

1. What was Freud's theory about dreams? (Freud believed that dreams were the disguised shadows of our unconscious desires and fears.)
2. Today, what do researchers suspect about dreams? (They suspect that dreams are part of the mind's emotional thermostat, regulating moods while the brain is offline.)
3. According to psychologist Rosalind Cartwright, what can people do about their dreams? (She believes that dreams can be brought under conscious control to help people sleep and feel better. She says, "It's your dream. . . . If you don't like it, change it.")
4. Which part of the brain is especially active during dreaming and which is relatively quiet? (The limbic system [emotions] is especially

active, while the prefrontal cortex [intellect and reasoning] is relatively quiet.)

5. What is suggested by the research finding that most people seem to have more bad dreams early in the night, progressing toward happier ones before awakening? (This finding suggests that in their dreams, people are working through negative feelings generated during the day but not thought about at the time.)
6. Describe the process that Cartwright advocates to exercise conscious control over recurring bad dreams. (She says you should identify what is upsetting about the dream as soon as you awake. Then visualize how you would like the dream to end instead. The next time the dream occurs, try to wake up just enough to control its course.)
7. Generally, how much attention should we pay to our dreams, according to the author? (There's probably little reason to pay attention to our dreams unless they keep us from sleeping or are recurring nightmares that cause us to wake up in a panic.)
8. Write a one-sentence statement in your own words of the main idea of the article. (Rosalind Cartwright, a therapist who specializes in dreaming, suggests that people learn to take control of their dreams, changing bad dreams into good dreams through visualization.)
9. Can you usually remember your dreams when you wake up? Do you suffer from recurring nightmares?

Vocabulary

Fill in the blanks with the correct words. Use each word only once.

snore	stimuli	intrinsic	crucial
generated	sedative	cope	sound
disrupted	consequences	nightmares	deprivation

Sleep is a/an intrinsic need for all human beings. If someone misses a night of sleep, he or she may face serious consequences, such as not being able to cope with normal daily responsibilities or make rational decisions. Actually, sleep deprivation of only a few hours can also have negative effects, both physically and mentally. People may experience mood swings, increased anxiety, headaches, or slower physical responses when driving a car. In the 21st century, people don't get as much sleep as they used to, and sleep has become such a valued activity that the July 15, 2002, issue of *Newsweek* titled its cover story "In Search of Sleep."¹ Medical research has proved that a/an sound sleep is crucial to a person's sense of well-being.

Physicians and researchers have identified a wide variety of sleep disorders. Minor problems include not sleeping through the night or waking up too early in the morning. There are also severe sleep disturbances. For example, about 10 percent of the population suffers from insomnia and may have to take a/an sedative to fall asleep.² Doctors often advise these people to avoid stimuli such as drinking coffee or Coca Cola before bedtime. Others have problem sleepiness, which means they often fall asleep during the day. A serious form of this is called narcolepsy.³ Also, people may have trouble breathing correctly because they snore while they are sleeping. According to *Newsweek*, "10 to 20 percent of Americans seek treatment for snoring each year."⁴ One common problem connected to snoring is sleep apnea, a disorder in which sleep is frequently disrupted when the sleeping person stops breathing for a moment, thus waking up over and over. Sleep apnea is a life-threatening condition.⁵

Popular remedies that encourage sleep include wearing an eye mask when sleeping, drinking warm milk before going to bed, and exercising during the day, but these remedies may be useless to the millions of insomniacs

1. "In Search of Sleep," *Newsweek*, 15 July 2002, 38.
2. "Sleep: And So to Bed," *The Economist*, 21 December 2002, 113.
3. "Sleep Information for Patients and the General Public. Facts about Narcolepsy," in National Center on Sleep Disorders Research (www.nhlbi.nih.gov/about/ncsdr).
4. Mary Carmichael. "Sounds of Sleep," *Newsweek*, 15 July 2002, 41.
5. *Ibid.*, 41.

in the world. The National Center on Sleep Disorders Research at the National Institutes of Health in Bethesda, Maryland, is one of hundreds of research clinics that have been established to study sleep disorders and help people get a good night's sleep.⁶ A person who has a history of sleeplessness, experiences a poor quality of sleep, or has recurring nightmares may enter a clinic as the subject of research. Such research has generated several medical breakthroughs, including a new drug for narcolepsy.⁷ But sleep remains a mysterious activity. In "Sleep: And So to Bed" the author writes, "although sleep takes up such a large proportion of our lives, we know little about it."⁸

6. "Patient and Public Information. Organizations and Resources," in National Center on Sleep Disorders Research (www.nhlbi.nih.gov/about/ncsdr).

7. "Sleep: And So to Bed," 113.

8. *Ibid.*, 111.