

SAMPLE

Psychology
Teach Yourself Series
Topic 10: The importance of Sleep (Unit 4)

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Sleep

As it appears in Unit 4

Sleep is the most commonly occurring altered state of consciousness. We spend approximately one third of our lives asleep, or eight hours of every twenty-four. Sleep is a state in which we experience a reduced level of awareness. We are oblivious to our surroundings, yet we may experience bizarre internal thoughts (our dreams).

Most of what we know about sleep has been discovered in the past century due to increasingly sophisticated measuring devices.

Purpose of sleep

It is still unknown exactly why we sleep, although there are many theories. These theories have generally evolved from our knowledge of what happens if we do not achieve the required amount of sleep. This is known as sleep deprivation.

Survival (Evolutionary) theory

This theory proposes that we sleep in order to protect ourselves from danger. It suggests that we sleep at night, when it is dark, because that is the time that any predators would be out hunting. Therefore, by hiding away and sleeping, our likelihood of being attacked is reduced. This derives from our caveman days.

Limitations of this theory are that we may actually be at increased risk of being attacked when we sleep because we have reduced responses to stimuli and our reactions are lowered, hence we are actually more vulnerable. It also fails to explain why we experience physiological and psychological problems when we are sleep deprived.

Restoration theory

This theory proposes that we sleep in order to rest and restore our body's resources from their depletion that occurs during the day. When we sleep our cells, muscles, glands and organs have a chance to replenish. Sleep also replenishes the mental functions of our brain.

Evidence for this theory comes from the fact that we spend more time in deep sleep (Stages 3 and 4) if we have had a particularly physically exhausting day, therefore suggesting that deep sleep is necessary for physical repair. We tend to spend more time in REM sleep if we have had a mentally exhausting day.

However, limitations of this theory are that, even if we are well rested, we do not require less sleep. If you spend a day on the couch, you will require as much sleep as you would if you had a busy day. This is also the case for chronically inactive people (due to illness).

Consolidation theory

This theory proposes that we sleep in order to process and consolidate information that we have learned throughout the day. Sleep also helps us to filter any unwanted or unnecessary information. It is thought that REM sleep is particularly important for this process.

Studies have found that people perform more poorly on cognitive tasks if they are sleep deprived than if they have adequate sleep.

Limitations of this theory tend to focus on the methodology employed by the studies and the inability to determine if it is just sleep that causes the poor performance or the stress caused by the lack of sleep.

Characteristics and the patterns of the stages of sleep

As it appears in Unit 4

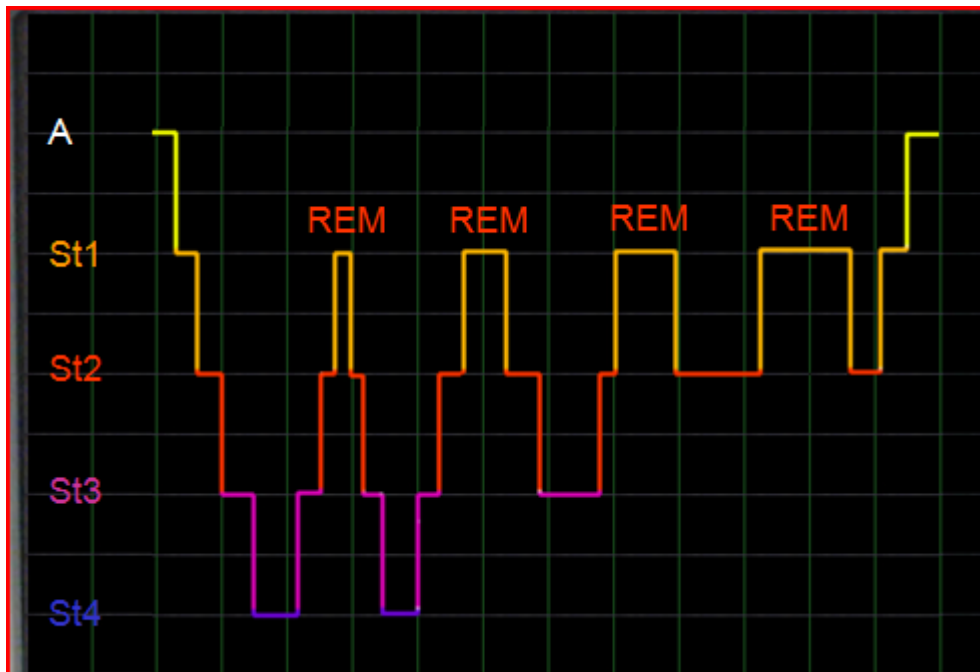
Sleep can be divided into two distinct types - REM sleep and NREM sleep. REM stands for Rapid Eye Movement and NREM for Non-Rapid Eye Movement Sleep. REM sleep is named for the way our eyes dart backwards and forward quickly underneath our eyelids during that stage.

Most adult humans require eight hours of sleep every twenty-four hours. This is known as a circadian rhythm. The pattern of wakefulness and sleep is known as the sleep wake cycle. Each sleep cycle follows a distinct and consistent pattern of NREM and REM sleep.

Human sleep cycle

Each night we experience a distinct pattern of sleep, alternating between NREM and REM sleep. We experience approximately 4-5 cycles per night, with each cycle lasting about 90 minutes. The pattern of this sleep can be seen in the diagram below.

Figure 1: The human sleep cycle



A nights' sleep typically goes like this: We fall asleep and enter Stage 1 sleep, then we enter Stage 2 sleep, then Stage 3 and then Stage 4. Then we go back to Stage 3, Stage 2 and perhaps Stage 1 (briefly), before entering our first period of REM sleep. As the night progresses (as we get closer to morning), we spend less time in NREM sleep (not even entering Stages 3 and 4) and longer in REM sleep. So, our time spent in REM sleep increases as the night wears on.

A summary of the stages of sleep can be found on the following page.

Solutions to Review Questions

1. This theory proposes that we sleep at night when it's dark to hide from our predators. An advantage of this theory over the consolidation theory is that it explains why we sleep at night as opposed to during the day when it is light.
2. We experience 4-5 cycles per night, each lasting approximately 90 minutes. We enter Stage 1 (5 minutes) and then enter Stage 2 sleep (20 minutes), then Stage 3 (5 min) and Stage 4 (20 minutes). We then regress back through Stages 3, 2 and possibly 1 before entering our first period of REM sleep. As the night progresses we spend less time in Stages 3 and 4, and more time in REM sleep. REM sleep stages are longer and closer together as the night progresses.
3. During REM sleep we experience beta-like brainwaves; our brain is very active but our body is in a state of paralysis. Most of our dreams occur when we are in REM sleep. When we are in NREM, our body is relaxed and we can move, but our brain is not as active.
4. In REM sleep we experience waves that are similar to beta waves. They have high frequency and low amplitude. They are sometimes called sawtooth waves.
5. Sleep spindles and k-complexes.
6. This is the recovery pattern of someone who has been deprived of REM sleep. Typically, they will move through NREM faster in order to get into REM quicker and will spend a longer time in REM sleep than usual.
7. Neonates require the most amount of sleep (16-17 hours per day), young children require approximately 10-12 hours, adolescents require 9-10 hours but many receive less, adults require 8 hours and the elderly require only 6-7 hours.
8. Any of the following:
 - feeling sleepy and tired
 - droopy eyelids and bags under eyes
 - difficulty focusing the eyes
 - slurred speech
 - shaky hands
 - increased sensitivity (to pain, cold)
 - lack of energy

- lowered coordination
- slower reaction time
- experience of microsleeps
- hormone imbalance
- lowered body temperature
- slowing of heart and respiratory systems
- lowered immune system functioning

9. Any of the following:

- increased irritability
- increased moodiness
- decreased attention span
- lack of motivation
- impaired memory
- impaired decision making
- impaired problem solving
- impaired creativity
- impaired capacity for positive thinking
- greater impairment on simple cognitive tasks compared with complex tasks
- hallucinations
- delusions
- paranoia
- depression

10. **Sleep apnoea:** This is a temporary cessation of breathing during the night (can be 20 seconds or more) which deprives the person of oxygen. It is associated with snoring where the person gulps for air then settles back to sleep. This may happen hundreds of times throughout the night and can be very dangerous to the person's health. **CPAP (continuous positive airway pressure)** is a breathing mask used to treat obstructive sleep apnoea.