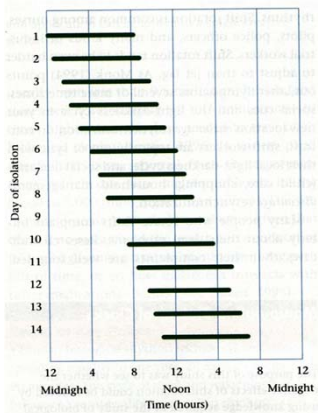


States of Consciousness:

Sleep

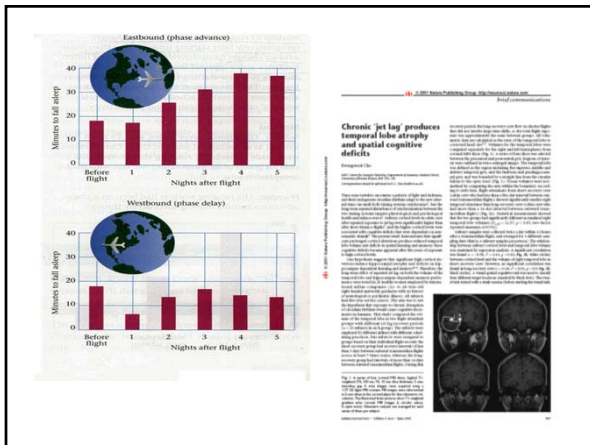
Circadian Rhythms

- Circadian rhythms are daily biological cycles
 - They are our 24 hour cycles that we have
- If we are shut off from external cues (like sunlight), would we still stay on a 24 hour cycle?

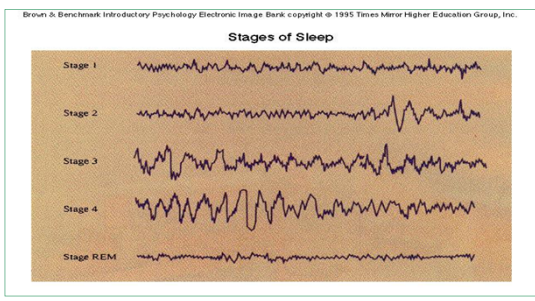


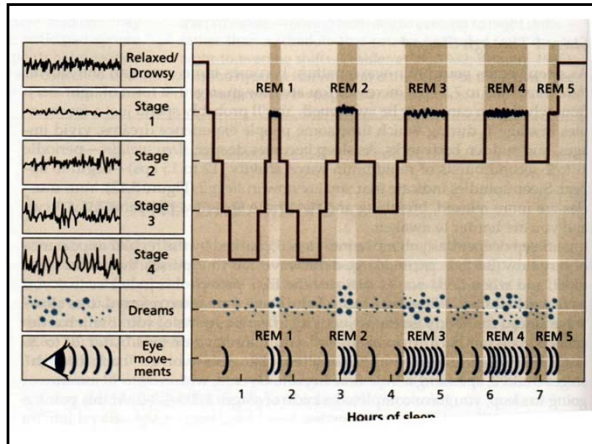
Circadian Rhythm Disruption

- Jet lag
- Nightshift work



Sleep



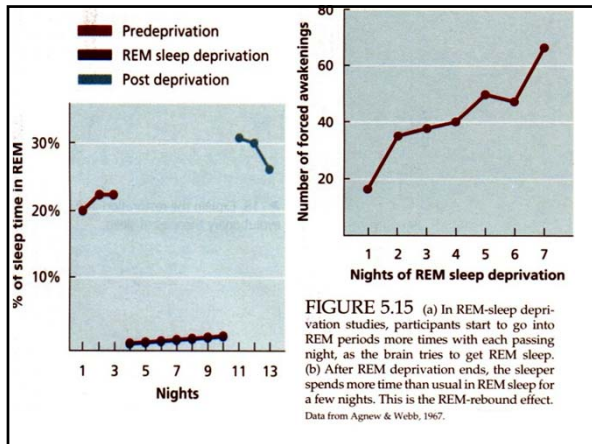


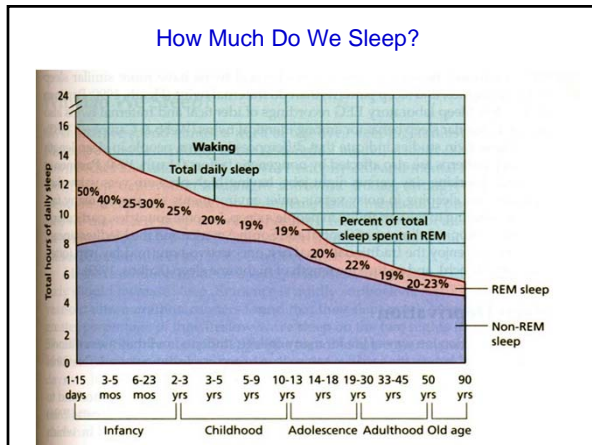
Stages of Sleep

- We cycle thru REM about 4-5 times per night
- As the night progresses, we spend more time in REM and less time in Slow Wave

REM Sleep

- We cycle thru REM about 4-5 times per night
- As the night progresses, we spend more time in REM and less time in Slow Wave
- ♦ Characteristics of REM sleep
 - Physiological arousal increases
 - Heart-rate quickens
 - Brainwave activity resembles wakefulness
 - Genital arousal
 - Muscles very relaxed, almost paralyzed
 - Rapid Eye movements
 - Dreaming is much more likely





Sleep Deprivation

- ♦ Leads to decreased concentration
 - ♦ Increases risk of accidents - microsleeps
 - ♦ An "all nighter" can be as impairing as .05 BAC

J. Sleep Res. (2003) 12, 265-274

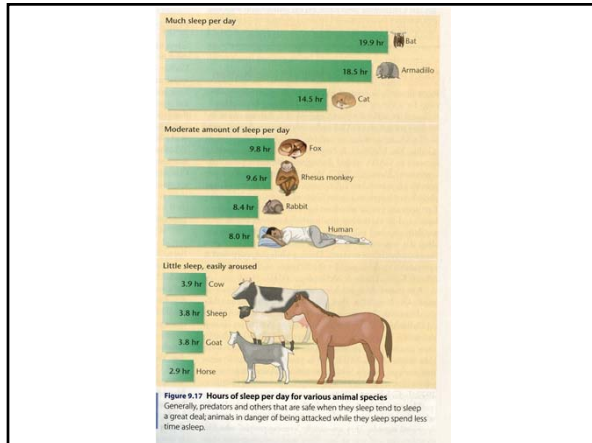
Qualitative similarities in cognitive impairment associated with 24 h of sustained wakefulness and a blood alcohol concentration of 0.05%

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Theories of Sleep

- Restoration Model
 - Sleep allows us to recharge our bodies and recover from fatigue (NREM increases after physical exertion)
 - Function of REM Sleep
 - Sort/retain memories that help solve problems
 - Stress increases REM
- Evolutionary/ circadian rhythm model
 - Sleep's main purpose is to increase a species' chances of survival



Sleep Disorders:

Sleep Apnea

- Impaired breathing while sleeping
- Leads to impaired attention, sleepiness, & depression during the day.
- Lack of oxygen can lead to neuron loss in brain
- Treatment
 - Lose weight, avoid alcohol/tranquilizers
 - Surgery or breathing machine



Figure 9.16 A Continuous Positive Airway Pressure (CPAP) mask
 The mask fits snugly over the nose and delivers air at a fixed pressure, strong enough to keep the breathing passages open.

Narcolepsy

- Sudden onset of REM sleep
- Frequency is .02 to .2% (2 per 1,000 to 2 per hundred).
- Sleep paralysis
- Cause: lack of cells that produce the neurotransmitter orexin (helps maintain wakefulness)
- Has been seen in dogs (canine narcolepsy) and mice
- Treatment: stimulant drugs like Ritalin.



Figure 2 Narcoleptic Doberman pinschers in the midst of cataplectic attacks. The attacks were elicited by the emotional excitement of playing together. Cataplectic attacks involved an abrupt flaccid paralysis of all postural muscles. Electrophysiological findings during cataplexy are similar to those during REM sleep. However, eyes are sometimes open, and the phasic phenomena of REM sleep, such as rapid eye movements or muscle twitching are not observed as frequently as during REM sleep, especially at the beginning of cataplectic attacks.

The Sleep Disorder Canine Narcolepsy Is Caused by a Mutation in the *Hypocretin (Orexin) Receptor 2* Gene



Sleep Disorders (cont)

- Periodic Limb Movement Disorder
 - Legs can kick every 20 seconds for hours, mostly during non REM sleep.
 - Tranquilizers help suppress movement (clonazepam)
- REM Behavior Disorder
 - Muscles aren't paralyzed as usual and one can get up and act out dreams.
 - Most likely in older men, often associated with brain damage to the "pons" (sends messages to inhibit muscles)
- Night Terrors
 - Intense Anxiety. Occurs in NREM sleep & dream content is very simple (often just an image).
 - Attacks last 15-20 minutes, may hallucinate, may sit up, scream, or run around.
 - How different from Nightmares?

Referrals to an MD

REM Behavior Disorder

a 67-year-old man who was awakened one night by his wife's yelling as he was choking her. He was dreaming of breaking the neck of a deer he had just knocked down. This patient had tied himself to his bed with a rope at night for 6 years as a protective measure, owing to repeated episodes of jumping from bed and colliding with furniture and walls.

Sleep Disorders (cont)

- Sleepwalking
 - occurs during NREM sleep (stages 3-4)
 - Sexual activity can occur as well

I wake up about three hours after we go to bed to him masturbating in his sleep, either with one or both hands in his boxers. Sometimes he'll grab me with one arm. I don't know how to tell him though without embarrassing him. It is very weird to me, and it will negatively affect the relationship such that I don't want to go to bed with him if it is not resolved. Also, I think if I tell him he does this, he will be very embarrassed and will not want to stay over anymore. I just don't know how to bring up the sleep masturbating. (Subject 77)

I often wake up in the middle of sleepsex dreaming I'm being raped. It will start when he rolls over, almost robot-like, and aggressively goes straight for my panties. He rips my clothes off and proceeds to do his thing. During this, I am asleep and wake up with him on top of me. He is totally asleep and can't help it. If I'm more awake than asleep, I push him off, and he rolls over snoring. If I am more asleep than awake, I pretty much incorporate what's going on into my dreams and it's terrifying. It causes us to be extremely tired the next day. It causes tension in our marriage because he is too embarrassed to seek help. (Subject 9)

Above cases from from Mangan (2004)

Referrals to an MD

Sleepwalkers

Twenty-nine (53.7%) of the patients had repeatedly fallen out of bed or run into walls and furniture, 10 (18.5%) had jumped out of windows, 10 (18.5%) had left the house and driven automobiles, wandered around streets, walked into lakes, or climbed ladders, and four (7.4%) had wielded weapons such as loaded shotguns. Injury resulted from either frenzied activity or impaired judgment. Many patients reported fragmented, precipitous images (e.g., a fire, bright light, looming figure, or collapsing roof that prompted immediate escape) or, often, more elaborate and conventional dreamlike mentation with their nocturnal episodes.

A representative case vignette was provided by the wife of a patient who had diagnostic polysomnographic studies.

He seems to have the strength of 10 men and shoots straight up from bed onto his feet in one motion. He's landed clear across the room on many occasions and has pulled down curtains (bending the rods), upset lamps, and so forth. He's grabbed me and pulled on me, hurting my arms, because he's usually dreaming that he's getting me out of danger of some sort (usually something falling on us). He's landed on the floor so hard that he's injured his own body. The description "vaults explosively" describes it most clearly. There are low windows right beside our bed and I'm afraid he'll go through them some night.

Long-Term, Nightly Benzodiazepine Treatment of Injurious Parasomnias and Other Disorders of Disrupted Nocturnal Sleep in 170 Adults

Carlos H. Schenck, MD, Mark W. Mahowald, MD, *Minneapolis, Minnesota*

PATIENTS AND METHODS: During a 12-year period, one author evaluated and treated 170 adult referrals for ≥ 6 months with nightly benzodiazepine therapy for longstanding, sleep-disruptive disorders: injurious sleepwalking and sleep terrors (69); rapid eye movement sleep behavior disorder (52); chronic, severe insomnia (25); and restless legs syndrome/periodic limb movement disorder (24).

RESULTS: Complete/substantial control of the sleep disorders was achieved by 146 patients (86%);

1996