Chapter 3: Variations in sleep

Variations in sleep duration

- Large individual differences in sleep time per nycthemeron (~3 to 10 hours)
- Reports of people who never sleep are either false or due to rare genetics
- Compared to short sleepers, long sleepers:
  - get 2x REM sleep
  - have less efficient sleep
  - like sleep (short sleepers think it a waste of time)
  - tolerate sleep deprivation less well
  - may be more introverted and inclined to worry
  - may be less conforming

Variations are partly genetic:
- Human twin studies indicate moderate genetic component
- In mice, genetic differences in sleep duration
- Single drosophila gene mutation dramatically reduces “sleep” time (and longevity)

Variations in sleep duration among humans: Long sleepers have a longer biological night
- Sleep patterns and circadian rhythms recorded for group of short (<6 hrs) and long (>9 hrs) sleepers
Variations in sleep duration

- Long sleepers have a longer “biological night”
  - Sleep patterns and circadian rhythms recorded for group of short (<6 hrs) and long (>9 hrs) sleepers.

Sleep duration and longevity in humans

UCSD school of medicine (2002)

Sleep need and longevity in humans

- Implications for your sleep patterns?
  - Should you adjust your sleep time to 7 hours?
    - There is no evidence that 7 hours directly causes increased longevity
    - Even if directly causal, there are likely individual differences.
    - If you need more than 7 hours of sleep to avoid sleep deprivation, is it worth the daily misery for the small longevity effect?
  - Okay, so should you instead try to sleep 8 hours as is often suggested?
    - This guideline is also too simplistic.
  - Best strategy: be vigilant for signs of sleep deprivation and make adjustments.

Sleep onset time

- Circadian “subjective night” phase begins at different times for different people
- Early onset–early wakening (morning type): better sleep and better mood on awakening
- Late onset–late awakening (evening type): more alert during day and evening
- Neither finds it easy to adjust to sleep schedule of the other
- With aging, late onset drifts toward early onset
Bi-phasic sleep: Your evolutionary heritage

Teen sleep

- Teens are generally late onset, or “evening types”
- Big debate currently over whether school start time should be delayed
  - Students and teachers say yes:
    - 60% report being tired during the day; 15% fall asleep during school
- Later start time apparently helpful for learning and adjustment:
  - less depressed
  - more alert
  - trends toward improved grades

College sleep (or not)

- Collegiates are generally late onset sleepers
- Collegiate sleep problems (for freshmen in particular) are usually worse than for other teens and young adults
  - 73% report at least occasional sleep problems
  - Only 11% report good sleep quality
- Largely the result of lifestyle changes and pressures

Gender differences in sleep

- In many respects men and women sleep the same, but some differences:
  - Women go to bed a bit earlier, and sleep longer (~15 minutes)
  - Fragmented sleep begins at earlier age for men
  - Women report insomnia more often
  - No pronounced relationship between menstrual phase and changes in sleep architecture;
  - Oral contraceptives result in somewhat reduced SWS and REM sleep
  - Menopause
    - Transition phase results in more insomnia & night sweats
    - No polysomnographic differences for pre- vs. post-menopause
Strategies for improving sleep

- Relax before bed. Read, watch boring TV.
- If things are on your mind, make a detailed list before bed.
- Avoid caffeine, nicotine, alcohol.
- Create consistent sleep conditions (assists the circadian system).
- Daily exercise

Daily exercise (randomized study results)

Naps

Reason for napping:
- Recovery from sleep deprivation. As little as 10 minutes napping can substantially relieve sleepiness and improve cognitive performance.
- Circadian mid-day “dip”

Strong cultural component to naps
- Generally common in warm climates
- In about half of the world most people nap daily!

< 30 minutes \(\rightarrow\) no SWS, less sleep inertia on waking, generally ideal.

30 to 90 minutes \(\rightarrow\) risk of awakening from SWS

If sleep deprived, 90 to 100 minutes may be good; else may interference with night sleep.

Nap most helpful between about 2 and 3 pm.
Yawning

• Why do we yawn?
  - Correlated with sleepiness but no causal effect verified
  - Oxygen theory not supported
  - May have stimulating effect on muscles; can increase heart rate ~30%
    - Olympic athletes yawn before events

• Yawning is contagious
  - 55% of people will yawn within 5 minutes of seeing someone else yawn
  - Chimps show this
  - Synchronization of bedtime?