

## Sleep Hacks

Edward L. Platt <[ed@elplatt.com](mailto:ed@elplatt.com)>

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1. Intro
  - a. How I got interested in sleep
  - b. Why you should be interested in sleep
  - c. "Tired" - Sleepy vs. Fatigued
2. What is sleep?
  - a. Dement's two characteristics of sleep
    - i. Perceptual wall between conscious mind and outside world
    - ii. Immediately reversible
  - b. Stages of sleep
    - i. Awake - beta waves - high frequency, low amplitude
    - ii. Calm wakefulness - alpha waves - lower frequency, higher amplitude
    - iii. N1
      1. Theta waves - even lower frequency
      2. Very easy to wake
    - iv. N2
      1. Theta waves
      2. sleep spindles (high freq)
      3. K-complexes (high amplitude)
    - v. N3 (slow-wave sleep)
      1. Delta waves - very low frequency, very high amplitude
      2. Difficult to wake
      3. Growth hormone
    - vi. REM
      1. Rapid eye movement
      2. Atonia
      3. Dreaming
      4. Theta with bursts of alpha and beta
      5. Easy to wake
    - vii. N1 -> N2 -> N3 -> N2 -> REM
  3. Circadian rhythm
    - a. We have an internal clock that regulates when we sleep
    - b. Originally believed to be 25 hours
    - c. Actually about 24:10 without natural light
    - d. Opponent process model
      - i. Sleep debt
        1. Increases when we are awake
        2. Decreases when we sleep, about twice as fast
        3. Makes us sleepy
        4. Our bodies keep track for at least two weeks

- ii. Clock-dependent alerting
      1. Counteracts sleep debt
      2. Two peaks: morning, and evening
  - e. Role of light
    - i. Drives our circadian rhythm
    - ii. Eyes have melanopsin-containing ganglion cells (different from rods and cones)
    - iii. Pineal gland produces melatonin, inhibited by light
    - iv. Can shift our circadian rhythm forward or back
- 4. Sleep hygiene
  - a. Regular sleep/wake time every day
  - b. Avoid alcohol and caffeine 6 hours before bed
  - c. Exercise in the morning or late afternoon
  - d. Use the bed for sleep and sex only
  - e. Block out light and sound, but white noise can help
  - f. Get comfy!
  - g. If you can't sleep, get out of bed
- 5. Circadian rhythm hacking
  - a. Light therapy
  - b. Darkness therapy
  - c. Virtual darkness therapy
  - d. Melatonin supplements
    - i. As a sedative
      1. High dose (3-10mg) shortly before bed
      2. Up to 40 times higher than natural levels
      3. Causes grogginess in the morning
      4. Tolerance
    - ii. As a circadian phase shift
      1. Lower doses (0.5mg)
      2. Close to natural levels
      3. Several hours before bed
      4. Shifts circadian rhythm a little each day
  - e. Antihistamines
    - i. Diphenhydramine (benadryl)
- 6. Napping
  - a. Stages N1 and N2 only
  - b. 10-15 minute naps can be immediately refreshing
  - c. 30 minutes is most effective for most people
  - d. Length can depend on how sleepy you are
  - e. Best to nap during afternoon lull
  - f. Caffeine nap
- 7. Lucid Dreaming
  - a. 20% have lucid dreams naturally

- b. 60% can achieve them with training and practice
- 8. Polyphasic sleep
  - a. Biphasic sleep
    - i. Two sleep/wake cycles per day
    - ii. Approximately 8 hours
    - iii. Common before artificial light
  - b. Polyphasic sleep
    - i. Normal duration
      - 1. Sleeps of at least 45 minutes, 2 hours ideal
    - ii. Less duration
      - 1. Everyman - one major sleep, several naps
      - 2. Uberman - 6 evenly spaced naps of 20 minutes
      - 3. Controversial, reportedly very important to keep the timing
- 9. Conclusion
  - a. Better mood and performance
  - b. Easy to hack your sleep but requires diligence

#### References

*The Promise of Sleep*, William C. Dement

*At Day's Close: Night in Times Past*, A. Roger Ekirch