Sleep

Why do we sleep?

- U.S. Navy – 14 hours in bed

  12 hours

  7.5 – 9 hours

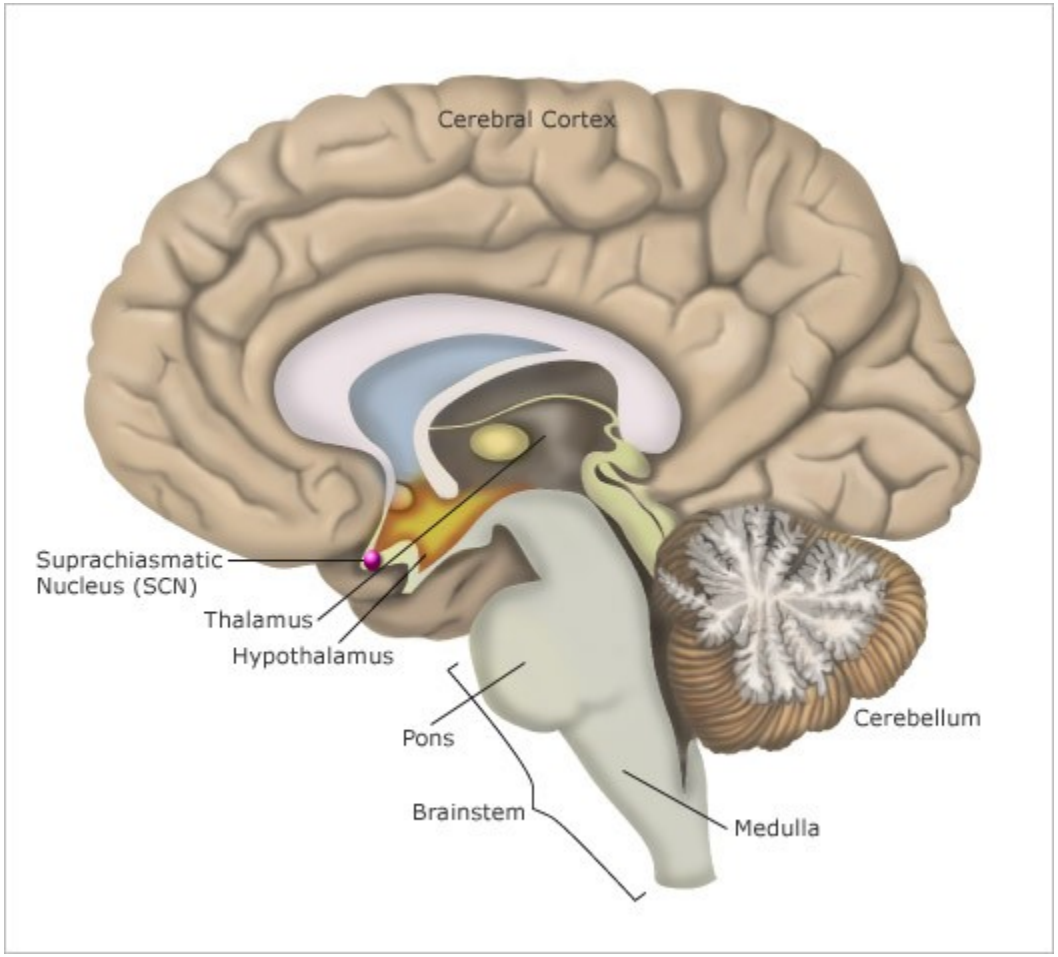
- Kahneman et al (2004) - 909 working women report on their daily moods

- Sleep Deprivation
  mood
  concentration
  memory
  appetite
  immunity
  hormonal functioning

- Circadian Rhythm – biological clock activated by light roughly synchronized with the 24 hour cycle of day and night

- Bright light activates light sensitive retinal proteins
- which signal the suprachiasmatic nucleus
- which signals the pineal gland to modulate

  melatonin - sleep inducing hormone

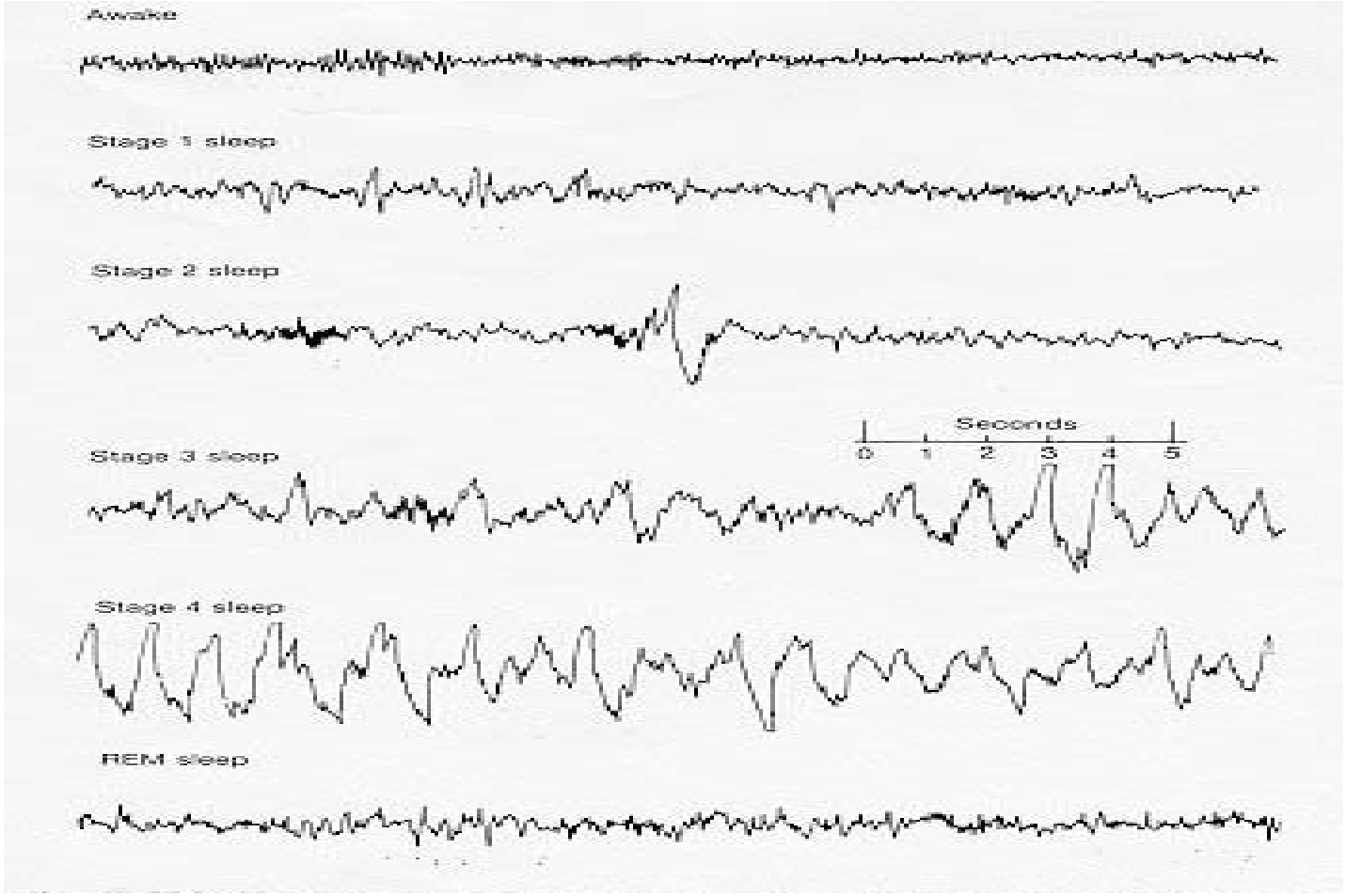

Cerebral Cortex
Suprachiasmatic Nucleus (SCN)
Thalamus
Hypothalamus
Pons
Brainstem
Cerebellum
Medulla

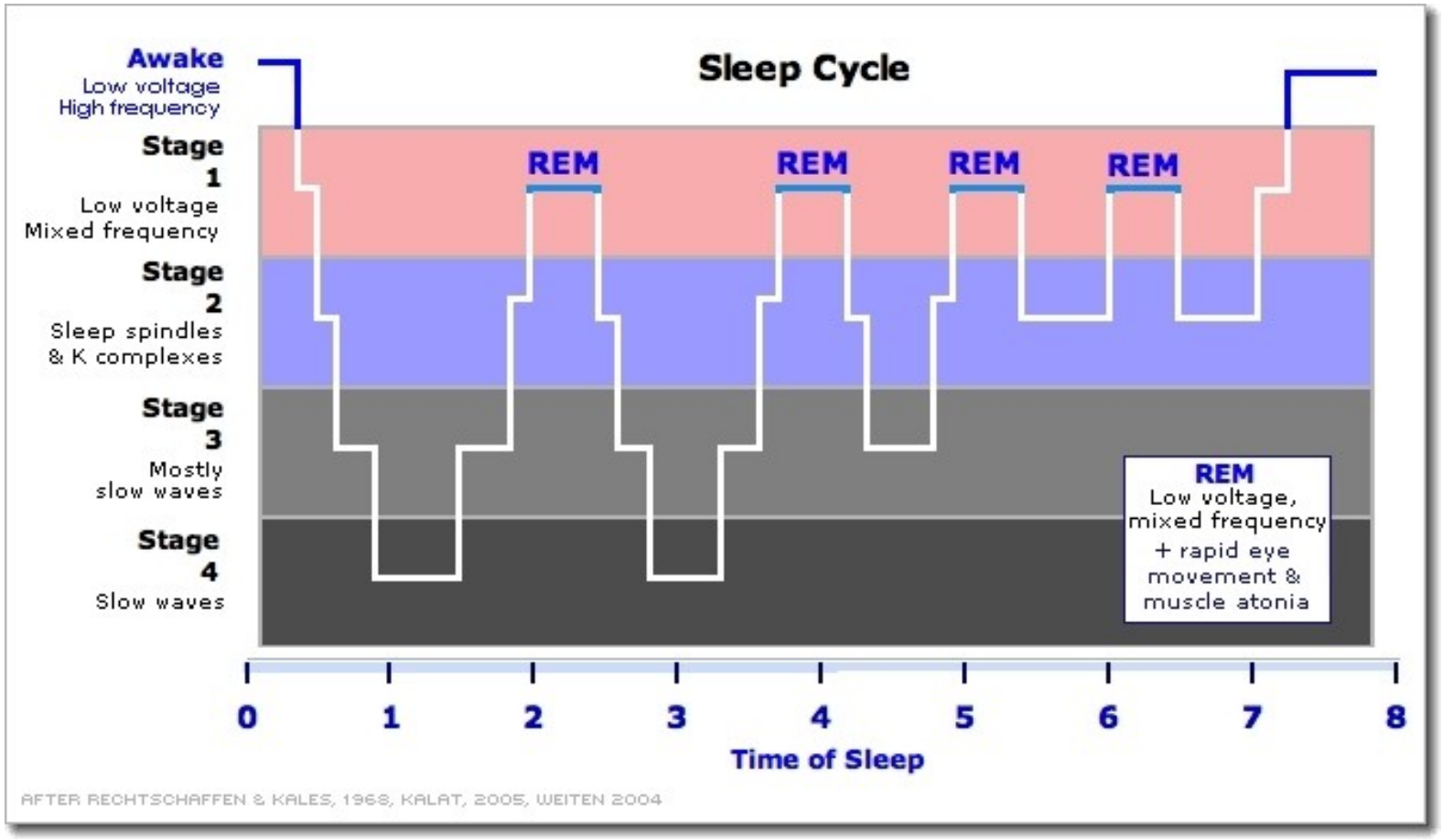
- Dement (1999) – sleep deprived participant with eyes taped open to press a button every time a stobe flashed – every 6 seconds

- Stages of sleep
  stage 1
  stage 2
  stage 3
  stage 4

  REM rapid eye movement – dream time
- As the night wears on stage 4 gets briefer and stage 2 and REM gets longer

Dement, 1978


Awake
Stage 1 sleep
Stage 2 sleep
Seconds
0 1 2 3 4 5
Stage 3 sleep
Stage 4 sleep
REM sleep


Sleep Cycle
Awake
Low voltage
High frequency
Stage 1
Low voltage
Mixed frequency
Stage 2
Sleep spindles
& K complexes
Stage 3
Mostly
slow waves
Stage 4
Slow waves
REM
REM
REM
REM
REM
Low voltage,
mixed frequency
+ rapid eye
movement &
muscle atonia
0
1
2
3
4
5
6
7
8
Time of Sleep
AFTER RECHTSCHAFFEN & KALES, 1968, KALAT, 2005, WEITEN 2004

- Stage 1 - hypnagogic sensations

- Stage 2 – sleep spindles
- Stage 3
- Stage 4 – delta waves – deep sleep

- REM waves appear like awake

Heart rate increases, rapid breathing

Sleep is when all the unsorted stuff comes flying out as from a dustbin upset in a high wind.

William Golding, *Pincher Martin*

- Dreams
  - previous day’s experiences
  - incorporate sensory stimuli into the dream

- Function of Dreams

  - file away memories

  those with higher grades sleep 25 min more each night (Wolfson & Carskadon, 1998)

  - make sense of neural static

  - provides periodic stimulation to the brain

- Freud *psychic safety valve* – express otherwise unacceptable feelings

  manifest content and latent content

- REM rebound

- Sleep talking
- Sleep walking - stage 4
- Lucid Dreaming
- Sleep Paralysis

Age and Sleep Needs

- Newborns (0–3 months) 14 to 17 hours[73]
- Infants (4–11 months) 12 to 15 hours[73]
  Toddlers (1–2 years) 11 to 14 hours[73]
  Preschoolers (3–5 years) 10 to 13 hours[73]

  School-age children (6–13 years)9 to 11 hours[73]
- Teenagers (14–17 years) 8 to 10 hours[73][74]
- Adults 7 to 9 hours[73]

National Sleep Foundation 2015

Sleep Disorders

- Insomnia

Exercise regularly – late afternoon

Avoid caffeine after early afternoon

Stick to a regular schedule

Relax with a book using lamp light

- Narcolepsy - sleep attacks that last less than 5 minutes, anytime in the day

- Sleep Apnea – stop breathing during sleep

Drugs & Consciousness

- Psychoactive Drugs – chemicals that change perceptions and moods through their actions at the neural synapses.

- Addiction – compulsive craving for a substance despite adverse consequences with physical symptoms associated with withdrawal

- Depressants – calm neural activity, slow body functioning
- Stimulants – excite neural activity and arouse body function
- Hallucinogens – distort perceptions, evoke sensory images in the absence of stimuli

Depressants

- Alcohol

  disinhibition

  slowed neural processing

  affects cerebellum
  hippocampus

  memory disruption
  (Suppresses REM sleep)

  reduced self awareness

- Barbituates – tranquilizers, mimic alcohol
  combined with alcohol - fatal

- Opiates – opium and it's derivatives – morphine and heroin
  brain stops producing its own opiates – endorphins when flooded with artificial opiates

Stimulants

Strong stimulants cause increased ht rt, breathing, dilated pupils, reduced appetite, increased energy and confidence

- Caffeine – awake, 4-6 hours
- Nicotine - acetylcholine, dopamine, epinephrine

- Methamphetamines – dopamine release – euphoria - reduces baseline dopamine

- Cocaine - dopamine, serotonin, norepinephrine

  rush and then crash

Hallucinogens

- LSD - serotonin, vivid hallucinations
- Marijuana – mild hallucinogen
- Common Effect across drugs

Continued use leads to diminished effects – tolerance - addiction

- Why do some people become addicted?

- Biological Influences
- Adopted individuals – more susceptible if one or more biological parent has a history
- Identical rather than fraternal twins are more similar in alcohol dependence/marijuana use
- Researchers have bred mice that prefer alcoholic drinks to water (Thiele et al, 1998)
- Researchers have identified genes – animals and humans – predisposed to alcoholism

  (NIH, 2006)

Psychological and Social influences

- Life is meaningless
- Stress
- Depression
- Teen drinking rates influenced by culture

  Marijuana Use Romania – 0-1%

  Britain, France – 20 -22 %
- Peers

- Near Death Experience

  12 to 40% of those who have come very close to death recall a NDE

bright light in the center of the vision field – tunnel like perspective

Out of body experiences, floating

- Oxygen deprivation – increased activity in the visual cortex
- Hallucinatory activity of the brain

- Cortical activity – flat line

  but may not detect sub cortical activity – hippocampus, amygdala