

SLEEP HEALTH

An Integral Part of Mental Health

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Disclosures

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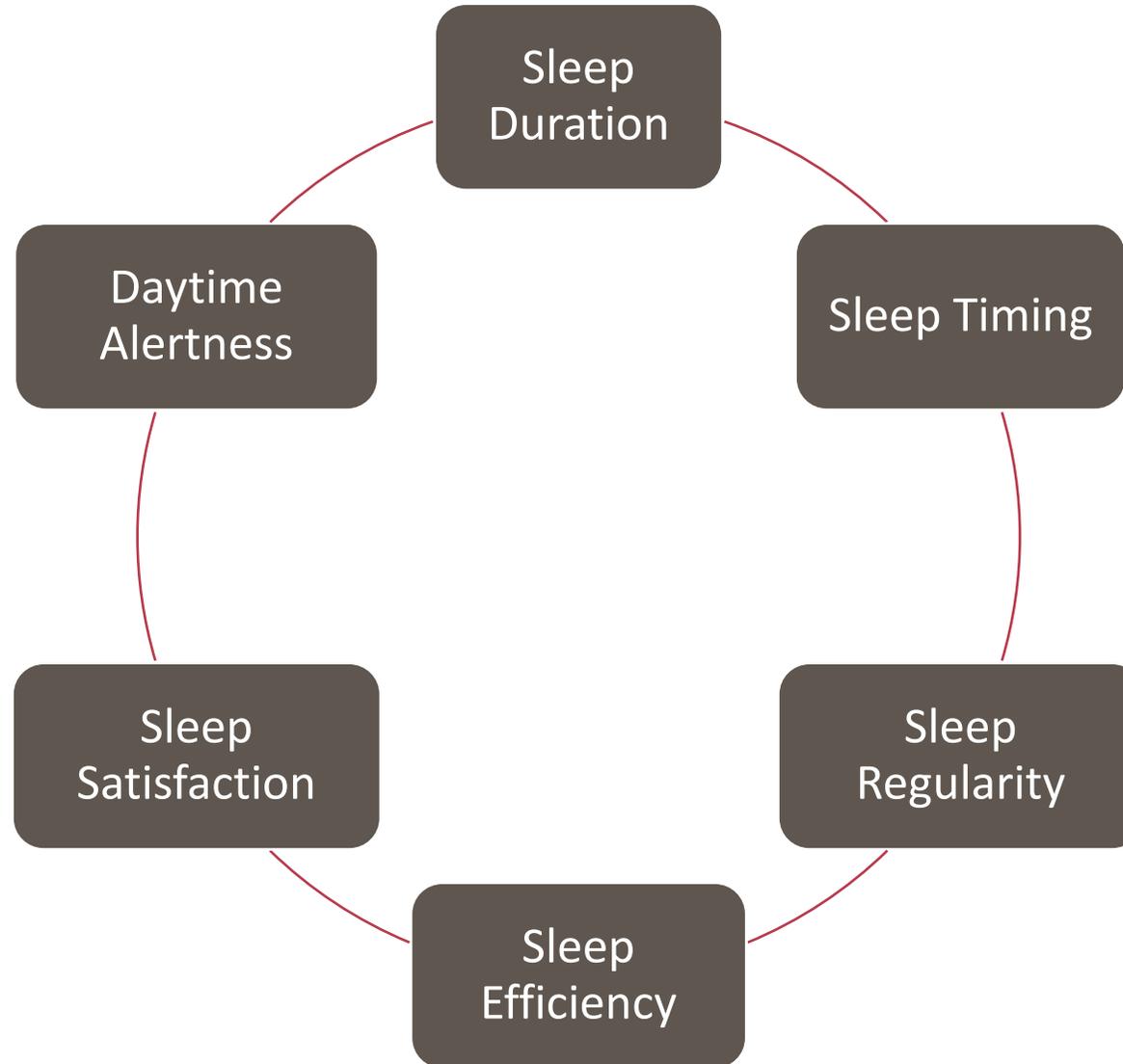
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Learning Objectives

As a result of participating in this activity, you should be able to:

- Discuss the bidirectional relationship, including shared pathophysiology, between the most common sleep and psychiatric disorders.
- Evaluate models of sleep health, sleep-wake biology, and developmental factors to identify possible points of intervention for improving sleep and psychiatric symptomatology.
- Identify strategies to target aspects in one or more of these models to improve not only sleep, but daytime energy and self-efficacy, leading to better management of psychiatric symptoms and increased ability to engage in psychiatric treatment.

Sleep Health



Sleep Disorders

Insomnia



Difficulty falling or staying asleep
(10%-15%)

Hypersomnia



Excessive daytime sleepiness
(2%-6%)

Nightmares



Vivid and distressing dreams
(4%-10%)

Circadian Rhythm Disorders



- Misaligned sleep-wake schedule
(~3%)

Obstructive Sleep Apnea



- Breathing interruptions during sleep
(~33%)

Restless Legs Syndrome



- Urge to move legs at night
(7%-10%)

Sleep-wake disruption and circadian dysregulation are core symptoms in most psychiatric disorders.

- Can precede the onset of a psychiatric disorder.
- Can exacerbate symptoms during a psychiatric episode.
- Can persist even after remission of symptoms.
- Can increase risk of relapse.
- Can be affected by sociodemographic factors (e.g., age, sex, race/ethnicity, education level, income bracket, relationship status).



Mood Disorders

Major Depressive Disorder

- Insomnia: ~85%
- Associated with higher rates with suicidality
- Hypersomnia: ~48%
- 25%-40% in atypical or seasonal depression
- Circadian Dysregulation: 20%-30%
- Nightmares: ~20%
- Up to 70% with suicidality
- Obstructive Sleep Apnea: ~30%
- Restless Leg Syndrome: ~30%-40%

Bipolar Disorder

- Insomnia: ~65% (especially during hypomanic/manic episodes)
- Hypersomnia: 25%-75% (especially during depressive episodes)
- Circadian Dysregulation: ~50% (core feature)
- Nightmares: ~25%
- Obstructive Sleep Apnea: ~50%
- Restless Legs Syndrome: ~7%-15%

Trauma and Anxiety Disorders

Posttraumatic Stress Disorder

- Insomnia: ~65%
- Nightmares: ~70% in posttraumatic stress disorder
- Obstructive Sleep Apnea: ~45%-75%
 - Higher in military / veteran populations
 - Prevalence varies with OSA severity
- Restless Legs Syndrome: ~15%-25% (inconsistent evidence)

Generalized Anxiety Disorder

- Insomnia: ~90%
- Nightmares: ~30%
- Restless Legs Disorder: ~15%-50%

Psychosis

Schizophrenia

- Insomnia: ~30% (higher in acute stage)
- Hypersomnia: No exact number but rates are elevated
 - Can be due to antipsychotic medications or avoidance of hallucinations
- Circadian dysregulation: 20%-80%
- Nightmares: ~55% in schizophrenia
- Obstructive Sleep Apnea: ~15%
 - >75% of high-risk individuals not diagnosed
 - Weight gain from medications is a risk factor
- Restless Leg Syndrome: 15%-20% (dopaminergic dysfunction)



Sleep is a transdiagnostic symptom

Sleep-wake disturbance should be assessed for all psychiatric disorders.



Subjective measures

- Sleep diary
- Questionnaires
 - Insomnia Severity Index
 - Epworth Sleepiness Scale
 - Morningness-Eveningness (short form)
 - STOP-BANG (for sleep apnea)
 - International Restless Legs Scale
 - Pittsburg Sleep Quality Index

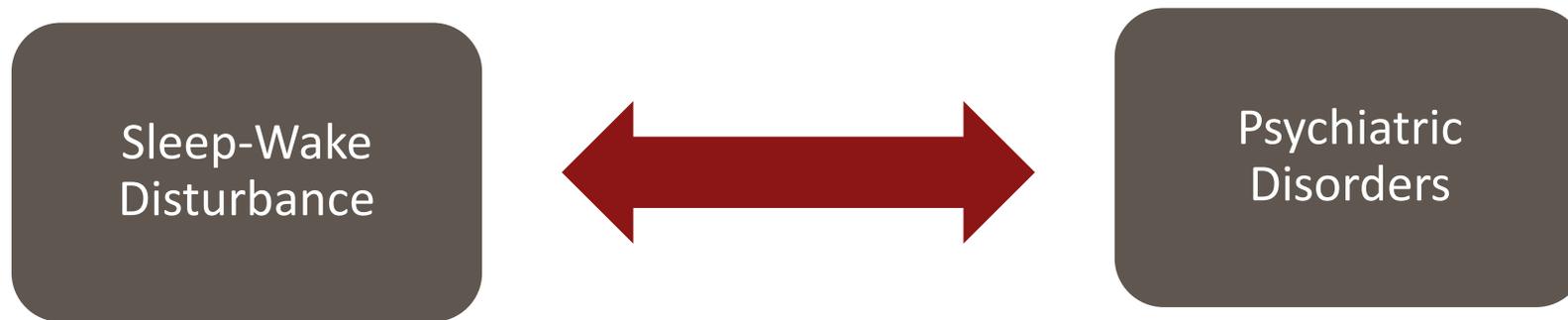


Objective measures

- Actigraphy
- Polysomnogram
- Home sleep apnea test
- Melatonin onset and / or offset

Relationship Between Sleep and Psychiatric Disorders

Bidirectional



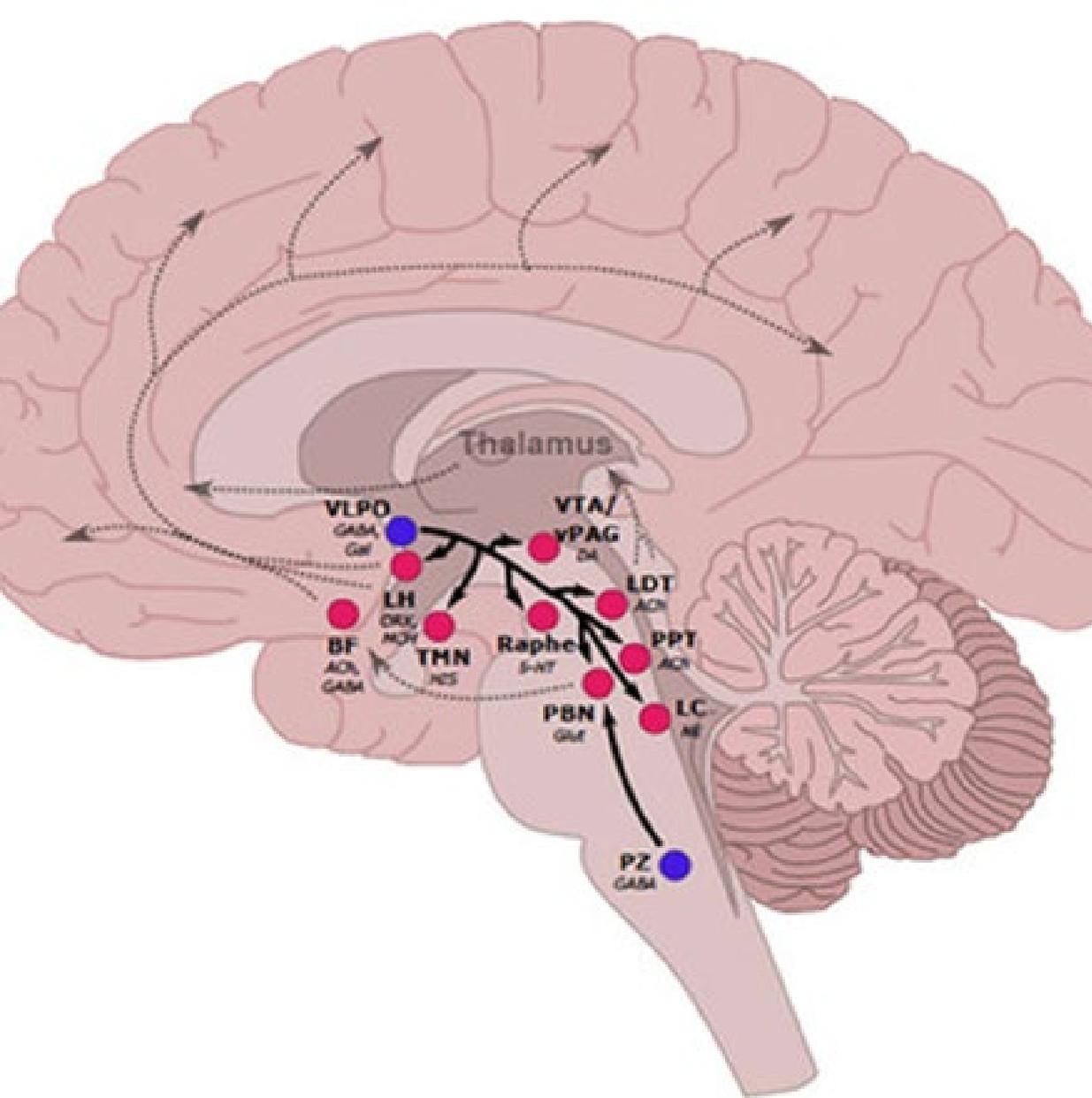
Sleep problems can precipitate psychiatric disorders, perpetuate and worsen symptoms, and increase risk of relapse.

Psychiatric disorders can disrupt sleep-wake patterns and all aspects of healthy sleep (duration, timing, regularity, efficiency, satisfaction/quality and daytime alertness).

Shared physiological pathways

- Monoaminergic system dysregulation
- Sleep architecture changes
- Circadian dysregulation
- Hypothalamic-pituitary-adrenal axis activation
- Neural network changes

Monoaminergic System Dysregulation



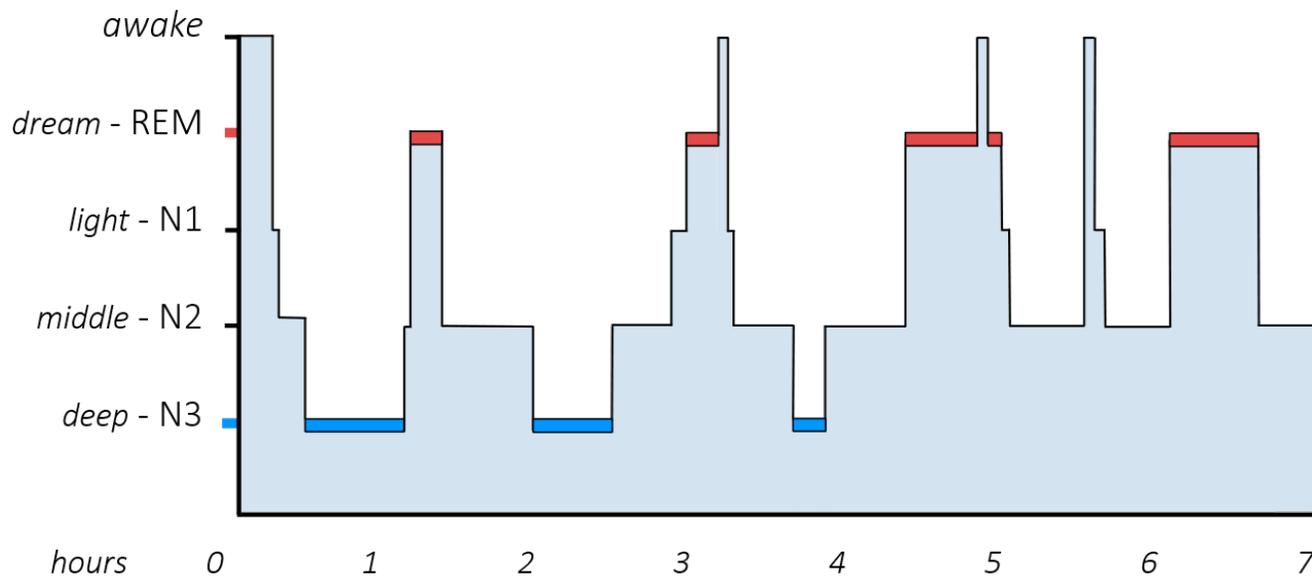
Sleep-promoting area (blue)

- GABA / ventrolateral pre-optic area (VLPO)

Wake-promoting areas (red)

- Glutamate / hippocampus, medial prefrontal cortex
- Dopamine / ventral tegmental area (VTA)
- Serotonin / dorsal raphe nucleus (Raphe)
- Norepinephrine / locus coeruleus (LC)
- Orexin / lateral hypothalamus (LH)

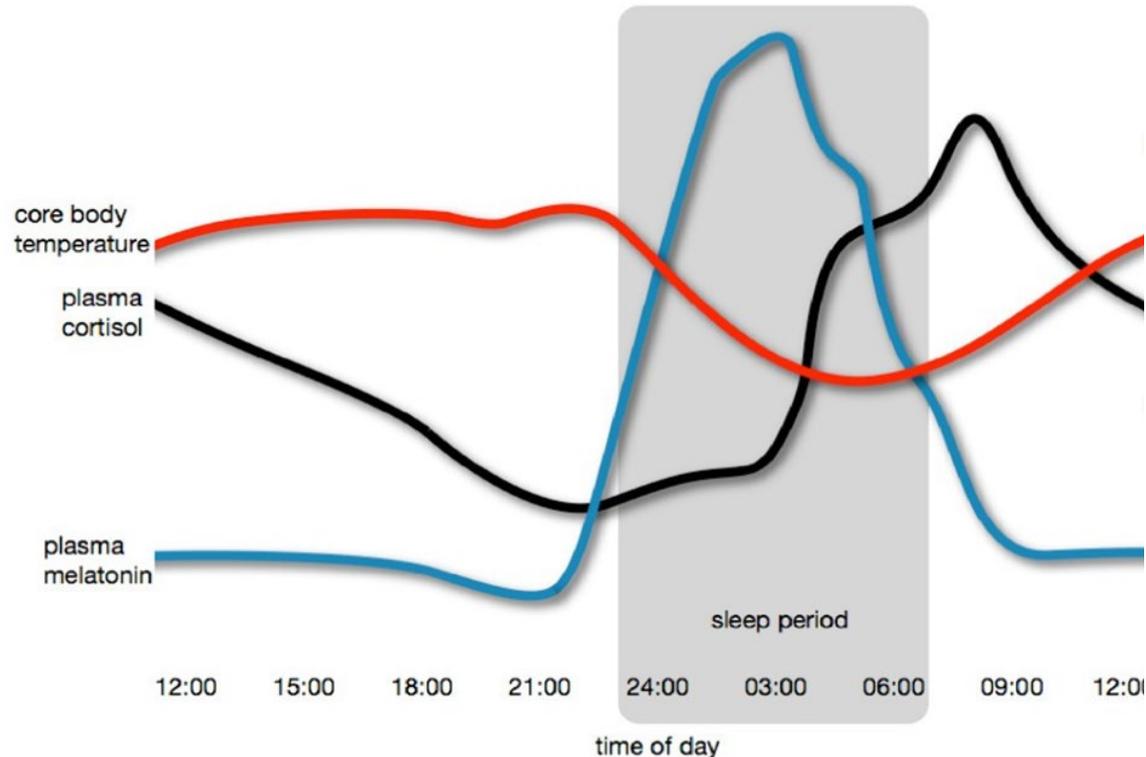
Sleep Architecture Changes



Psychiatric disorders can show altered sleep architecture, including...

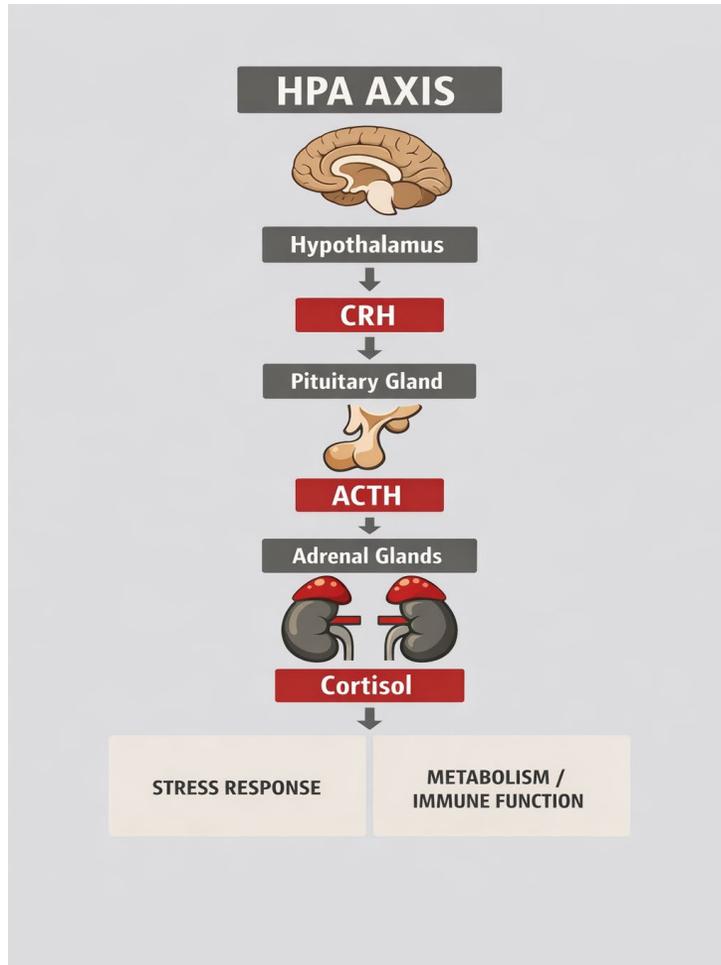
- Longer sleep onset latency
- Increased nighttime awakenings
- Greater wake after sleep onset
- Decreased N3 stage (deep) sleep
- Increased N1 stage (light) sleep
- Changes in REM episodes

Circadian Dysregulation



- Core clock genes and clock-controlled genes involved in circadian regulation share variants with depression and bipolar disorders.
- Changes in circadian biomarkers are seen in depression and bipolar disorders (e.g., melatonin and cortisol).
- Changes in sleep phase / timing (advance or delay) occur in depression and bipolar disorders.
- Seasonal components are associated with specific depression subtypes and possibly bipolar disorder.
- Acute sleep deprivation ("wake therapy") and bright light therapy have antidepressant effects.
- Circadian dysregulation is compounded by lifestyle and behavioral choices ("zeitgebers" such as timing of physical and social activity, light exposure, meals, etc.).

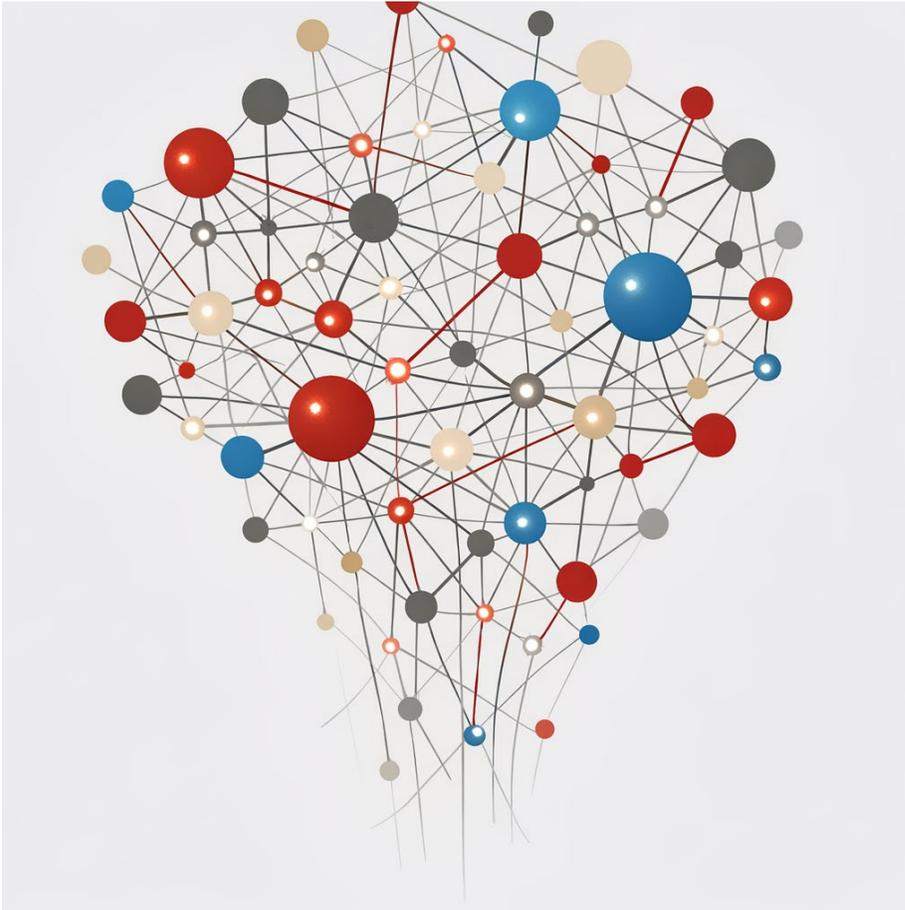
HPA Axis Hyperactivation



Many sleep and psychiatric disorders are characterized by...

- Increased sympathetic autonomic activity at night (e.g., reduced heart rate variability).
- Elevated cortisol levels across 24 hours, including in the evening.
- Increased pro-inflammatory cytokines (e.g., IL-6, TNF-a, CRP).
- Inflammatory processes are likely due to a combination of factors, including chronic stress, sleep disruption, changes in gut microbiota, glucocorticoid resistance, and lifestyle / behavioral factors.

Neural Network Changes



Many sleep and psychiatric disorders are characterized by changes in brain connectivity.

- Increased reactivity to negative stimuli in the amygdala.
- Hypoactivity in the prefrontal cortex with reduced executive control of attention, emotion, and decision-making.
- Decreased functional connectivity in cortico-limbic systems.
- Impaired hippocampal function, including poorer memory consolidation and weaker fear extinction learning.
- Increased activity in default mode network that alters cognitive processing (e.g., increased rumination, decreased positive affect, greater threat bias).

Treating sleep disturbance in psychiatric disorders

Evidence-based treatment for sleep disturbance can improve both sleep and psychiatric symptoms.

- Cognitive Behavioral Therapy for Insomnia (CBT-I)
- Imagery Rehearsal Therapy for Nightmares (IRT)
- Wake Therapy
- Light Therapy
- Dark Therapy
- Social Rhythm Therapy (SRT)
- Melatonin Therapy

CBT-I for Psychiatric Disorders

First-line treatment for chronic insomnia with a robust evidence base.

Moderate to large effect sizes in reducing **insomnia symptoms** in individuals with comorbid psychiatric conditions, with improvements sustained at follow-up.

- Major depressive disorder: ES = 0.8
- Bipolar disorder: ES = 1.4
- Generalized anxiety disorder: ES = 0.6
- Posttraumatic stress disorder: ES = 1.5
- Schizophrenia: ES = 1.1

Moderate effect sizes in reducing **psychiatric symptoms** in individuals with comorbid insomnia, with improvements sustained at follow-up.

- Major depressive disorder: ES = 0.5
- Bipolar disorder: ES = 0.4
- Generalized anxiety disorder: ES = 0.4
- Posttraumatic stress disorder: ES = 1.3
- Schizophrenia: ES = 0.3

IRT for Posttraumatic Stress Disorder

First-line treatment for chronic nightmares with a robust evidence base.

Moderate effect sizes in reducing **nightmare symptoms** in individuals with PTSD with improvements sustained at follow-up.

- Nightmares: ES = 0.6

Combined CBT-I and IRT improves **nightmare, insomnia, and PTSD symptoms** with moderate to large effect sizes.

- Nightmares: ES = 0.5
- Insomnia symptoms: ES = 1.7
- PTSD symptoms: ES = 1.0

Treatments are most effective when they facilitate a sense of control or mastery by directly targeting nightmare content and / or emotional response to nightmares.

Wake Therapy for Depression

Acute total (~36 hours) or partial (~20 hours) of sleep deprivation can elevate depressed mood within 24 hours although effects are temporary.

Significant response rate for improving **depressive symptoms** in individuals with major depressive or bipolar disorder.

- Response rate: ~50%

Mood-elevating effects of wake therapy...

- Can dissipate after 1 night of recovery sleep.
- Can be maintained with morning light therapy, sleep phase advance, and psychiatric medication ("triple chronotherapy").
- Benefits may stem mostly from partial sleep deprivation in the second half of the night (REM sleep stage).

Light Therapy for Depression

Evidence-based treatment using 5-10K lux broad spectrum light for 30 minutes in unipolar, bipolar, and seasonal depression, with effect sizes similar to antidepressant medication.

Moderate effect sizes in reducing **depressive symptoms** in unipolar, bipolar, and seasonal depression with improvements seen in 1-2 weeks and response / remission in 4-6 weeks.

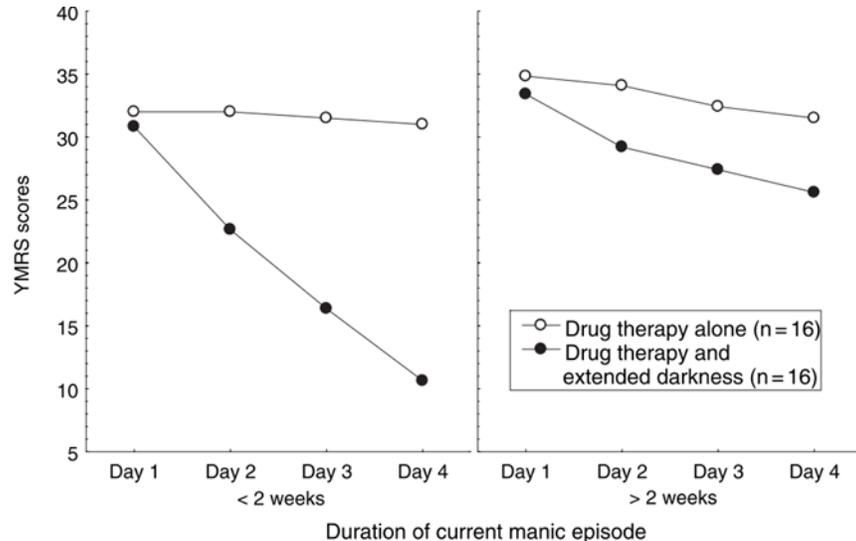
- Unipolar depression: ES = 0.5
- Bipolar depression: ES = 0.4
- Seasonal depression: ES = 0.4

No difference in affective switching between active light and placebo / control conditions in bipolar disorder (4%).

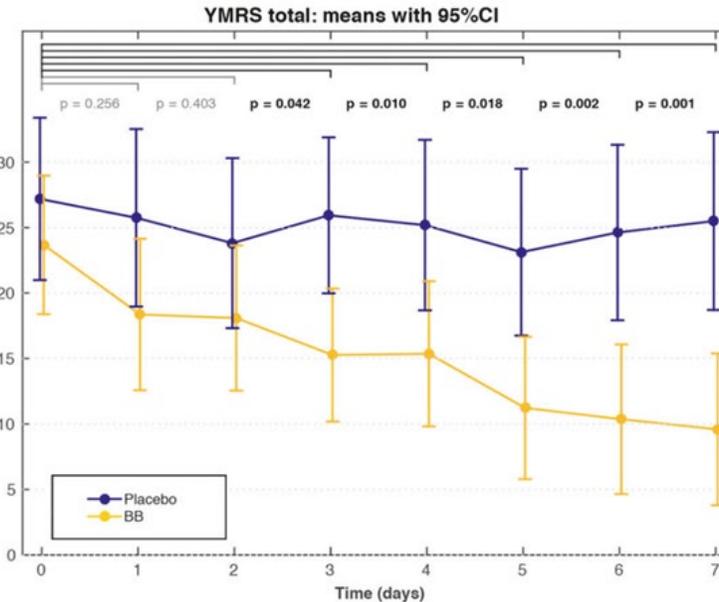
Color (broad spectrum white light), intensity (7-10K lux), duration (30-60 minutes), and timing (morning vs mid-day) of light exposure affect symptoms improvement.

Dark Therapy for Mania

Active avoidance or blocking of light at night has been used to treat mania.



RCT in which 16 medicated bipolar inpatients experiencing an active manic episode were constrained to 14 hours of darkness from 6:00 PM – 8:00 AM for 3 consecutive nights resulted in a faster decrease in reported manic symptoms than control group (TAU).



RCT in which 12 medicated bipolar inpatients experiencing an active manic episode were assigned to wear blue-light blocking glasses from 6:00 PM – 8:00 AM showed a faster decline in reported manic symptoms than placebo group (clear glasses).

SRT for Bipolar Disorder

Evidence-based intervention designed to stabilize major circadian rhythms (wake-sleep, activity-inactivity, feeding-fasting, and light-dark exposure).

Moderate effect sizes in regulating social rhythms and improving social functioning in bipolar disorder, with improvements sustained at follow-up.

- Social rhythm regularity: ES = 0.4
- Social functioning: ES = 0.5

Therapy was developed based on the theory that mood instability in bipolar disorder is triggered by dysregulation of circadian rhythms.

Treatment can include an interpersonal component that focuses on improving relational communication.

Melatonin Therapy in Psychiatric Disorders

Use of melatonin, the “hormone of darkness,” to advance and stabilize delayed circadian sleep-wake rhythms in individuals with psychiatric disorders.

Moderate effect sizes in advancing sleep-wake schedule and shortening sleep onset.

- Depression: ES = 0.6

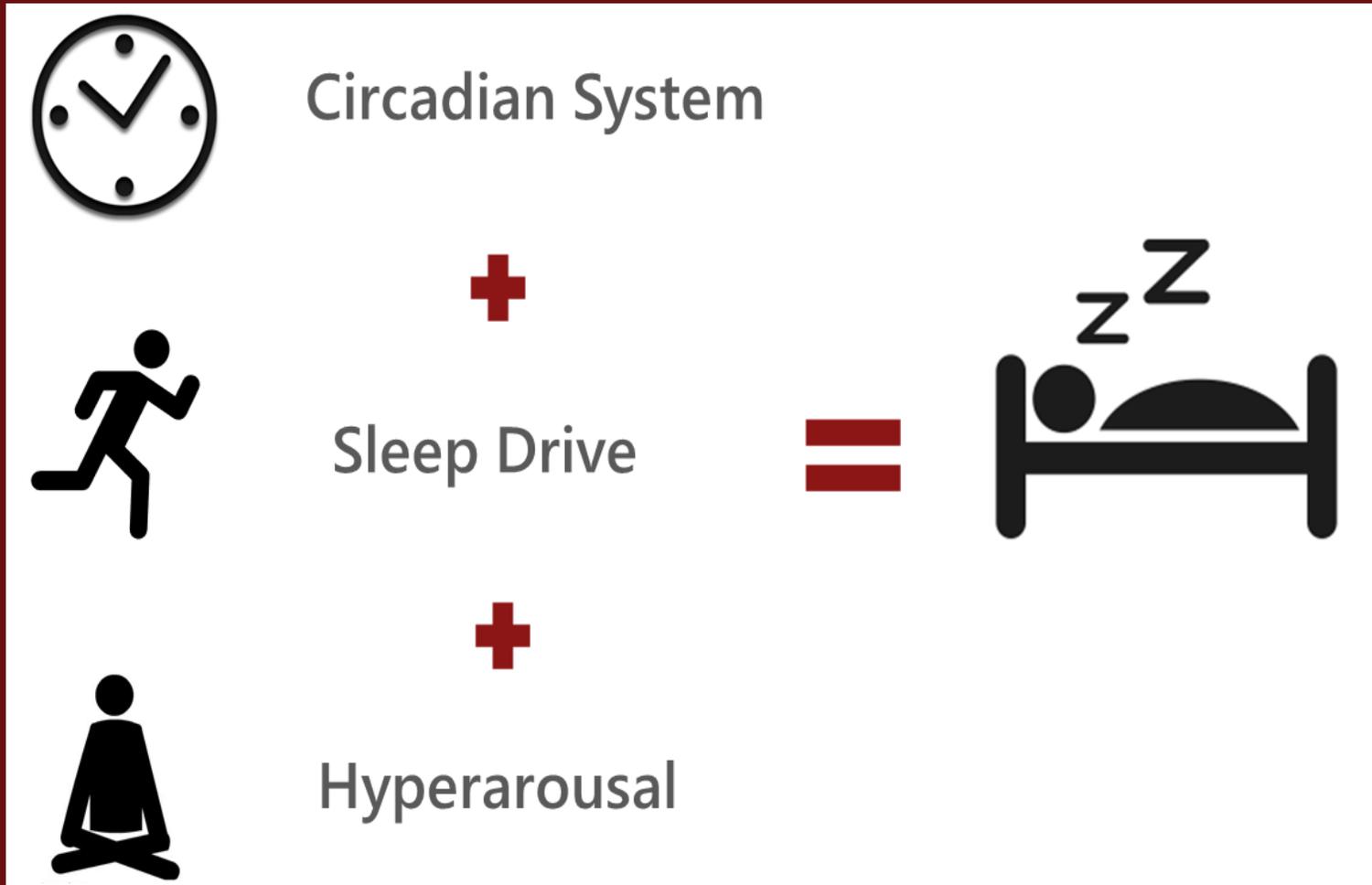
Moderate to large effect sizes in reducing depression symptoms.

- Unipolar depression: ES = 0.8
- Bipolar depression: RR = 0.7* (relapse rate due to depression)

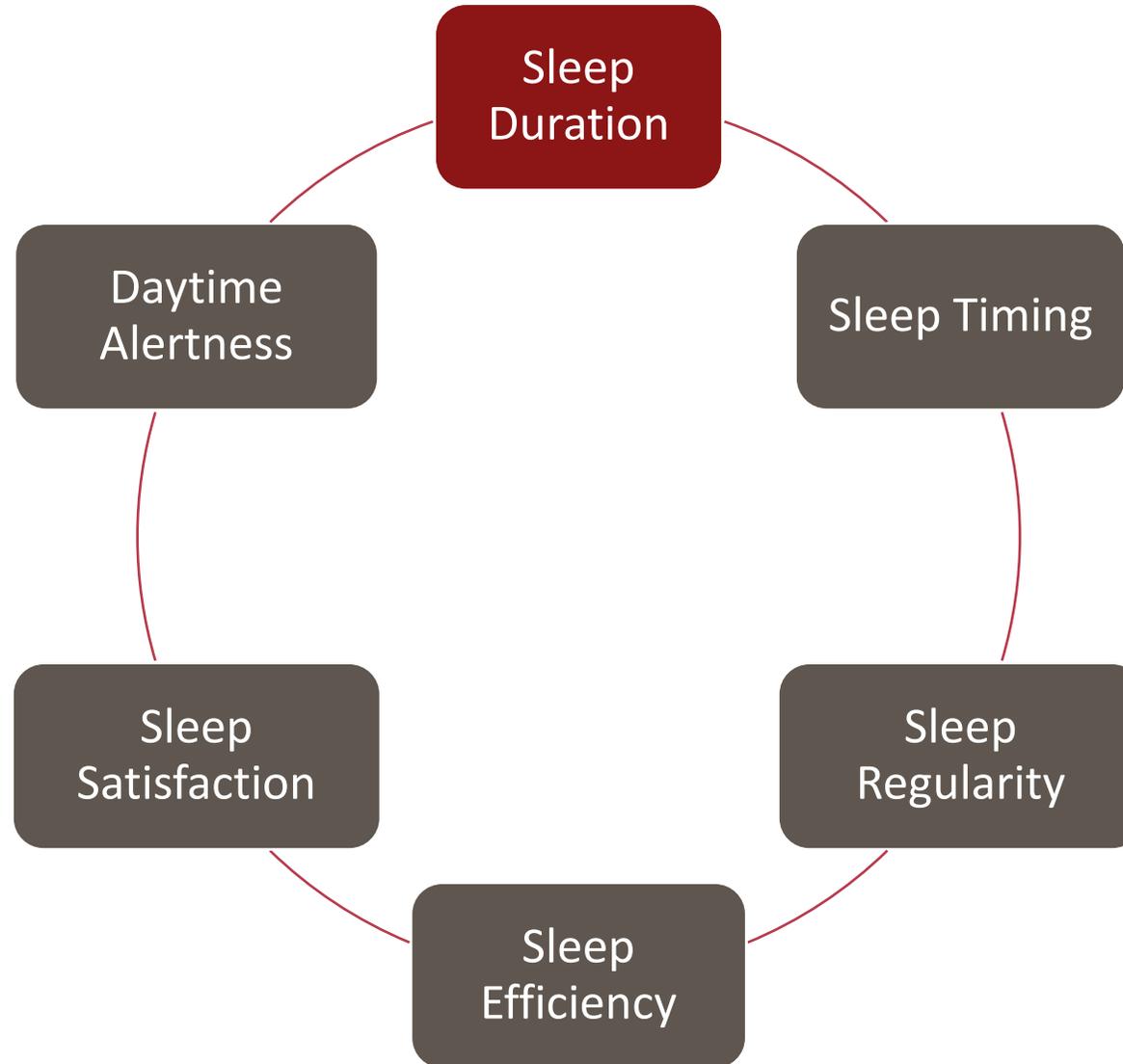
Timing and dosage make a difference.

- Lower and earlier dosing for advancing sleep schedule (e.g., <1 mg ~5 hours before bedtime).
- Higher and later dosing for reducing sleep disruption in psychiatric disorders (e.g., 2-3 mg 30-60 minutes before bedtime).
- Prolonged release melatonin can be helpful, especially in adults ≥ 65 yo and possibly for early morning awakenings in depression.
- Certified melatonin quality is important in the US given the lack of FDA regulation (NSF, USP).

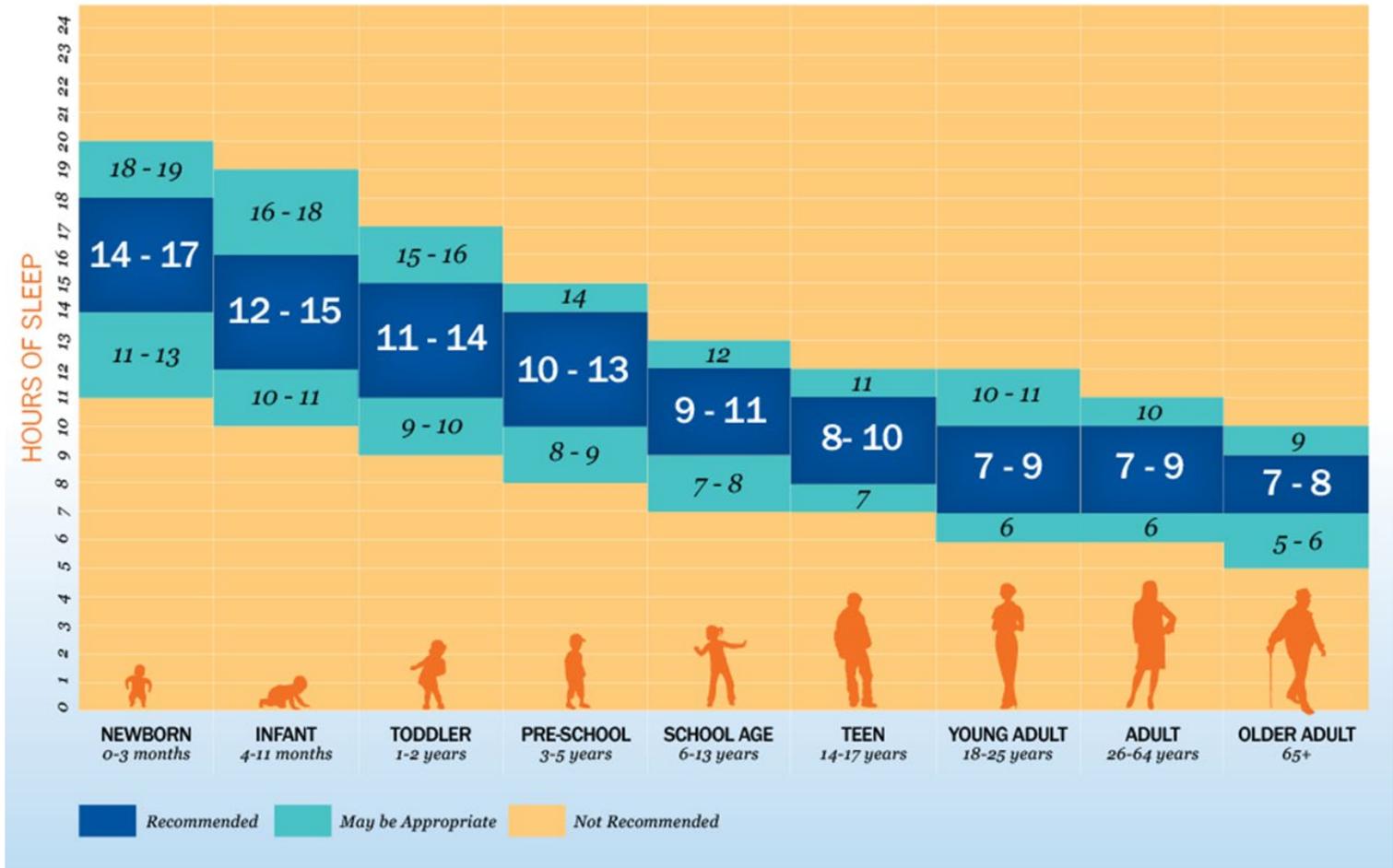
Targeting Sleep Health



Sleep Health



What is the Optimal Sleep Duration



Time in bed vs. Time asleep

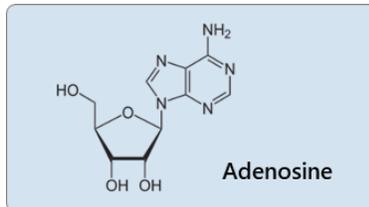
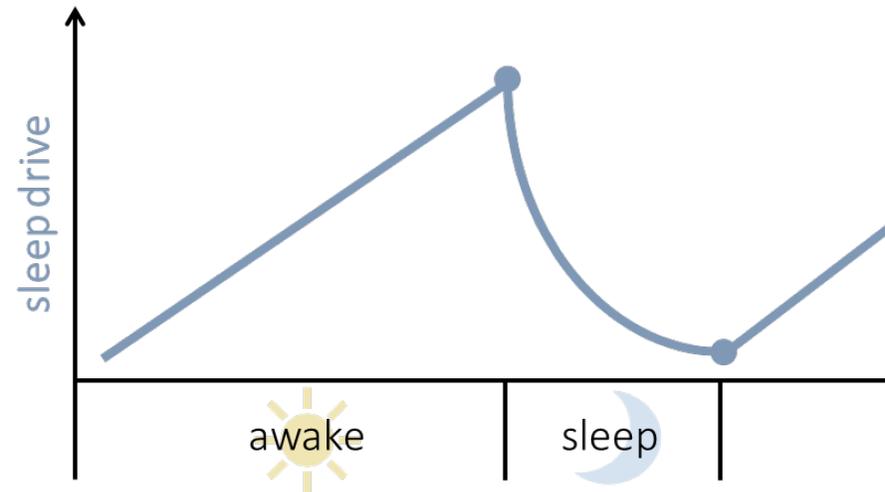
How Much Time to Spend in Bed



If your body produces 7 hours of sleep:

- Insufficient sleep = spending 5 hours in bed → spend more time in bed.
- Inefficient sleep = spending 9 hours in bed → spend less time in bed
- Optimal sleep = spending 7.5-8 hours in bed → spend that time in bed

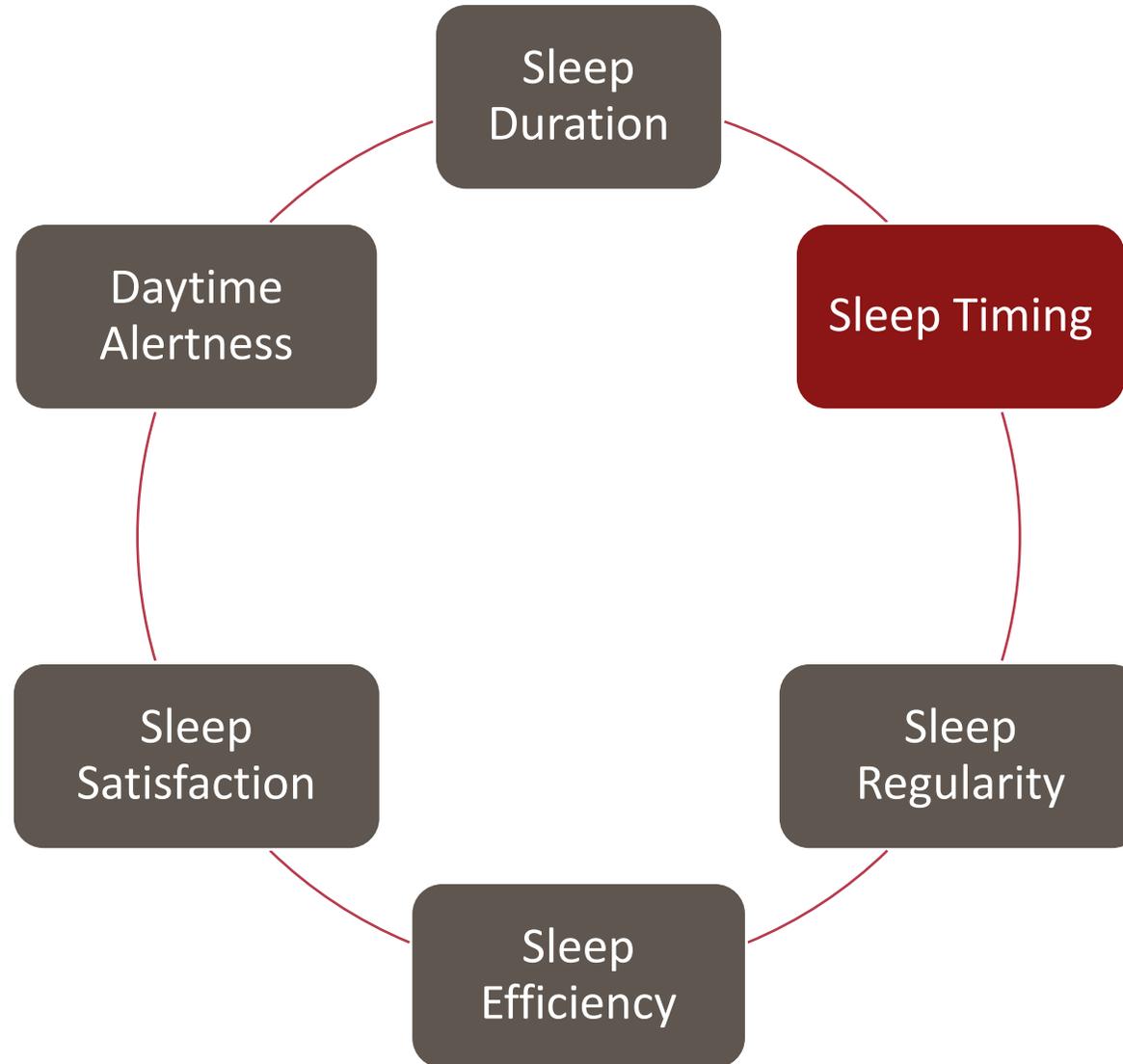
How to Build Sleep Pressure



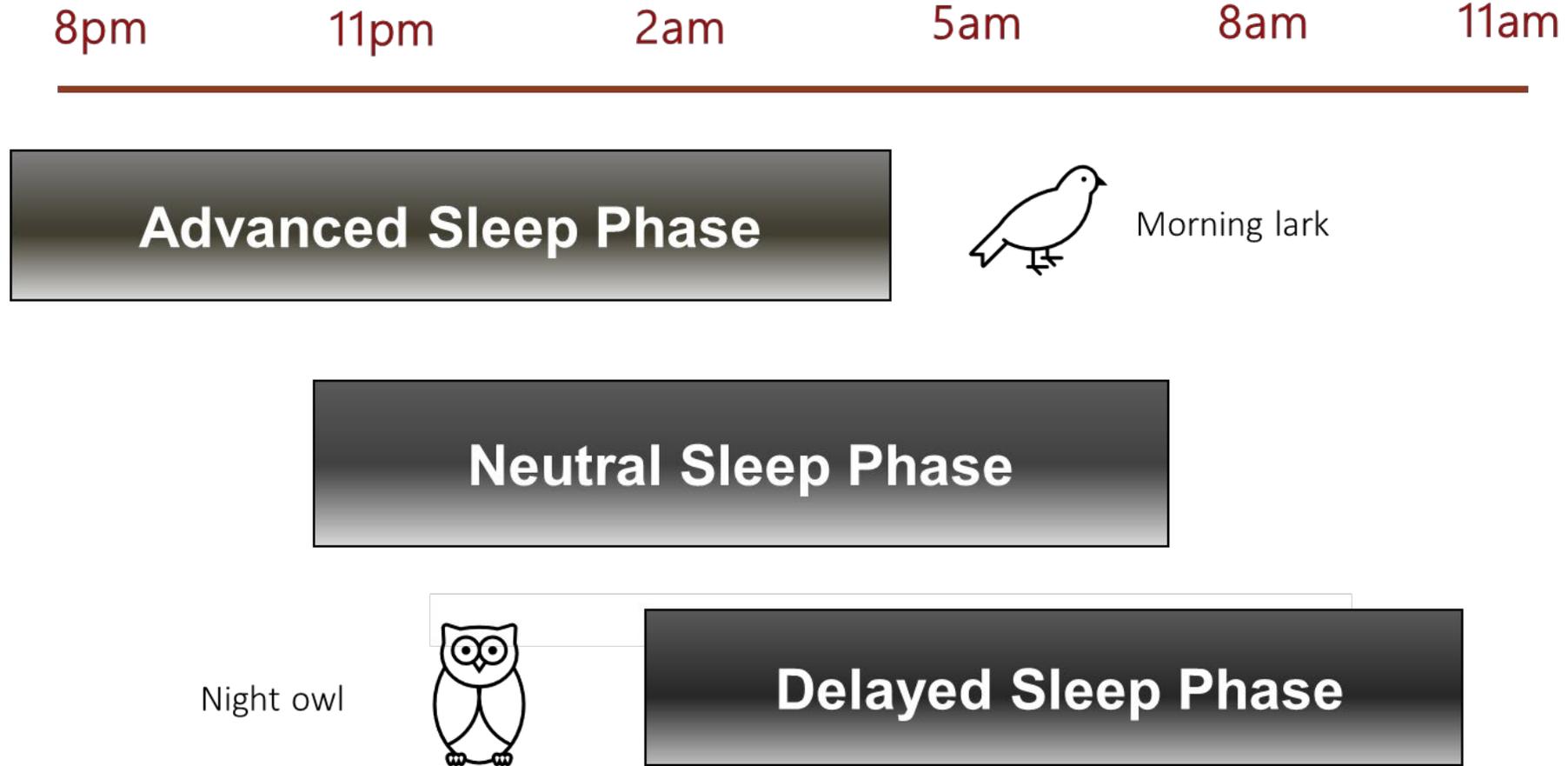
Tips for building strong sleep drive:

- Shorten your time in bed (for example, shift your bedtime later)
- Wait until you are sleepy to go to bed
- Nap strategically (brief, not too late)
- Increase physical activity / exercise
- Get outdoor light during the day
- Participate in social activities
- Stimulate your mind with hobbies
- Limit caffeine no later than lunchtime

Sleep Health



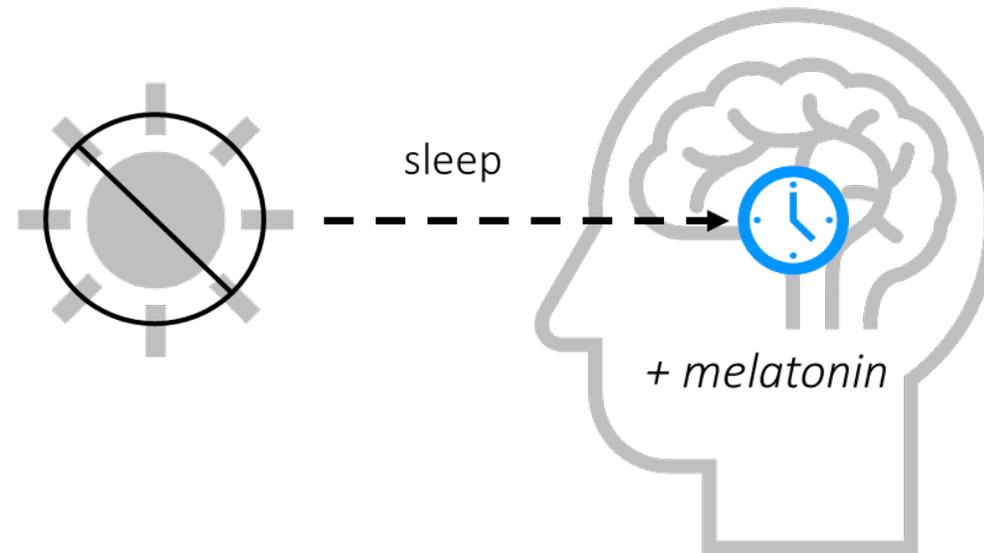
What is the Optimal Sleep Timing



How to Strengthen the Circadian Clock

Tips to support your body clock:

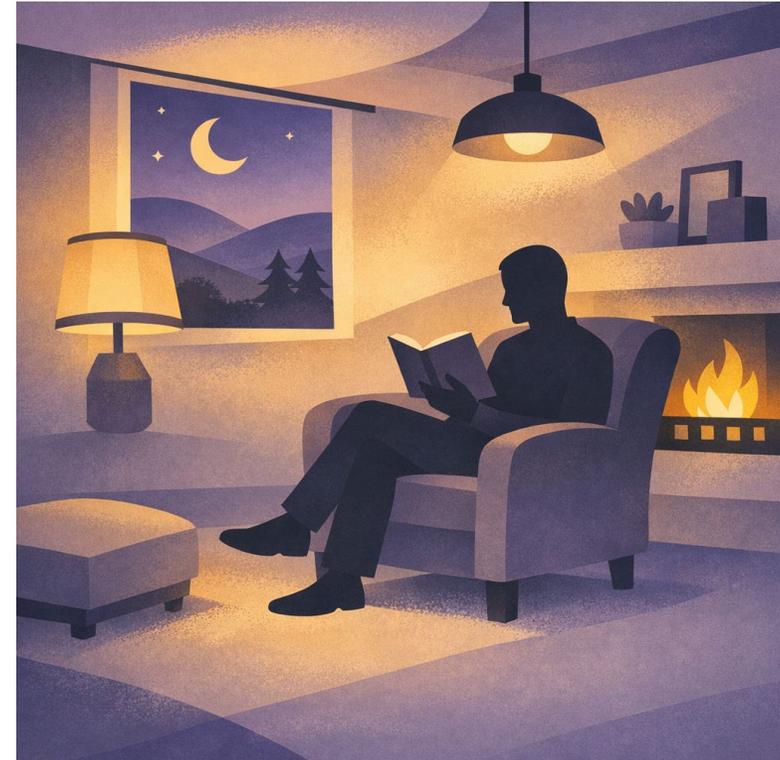
- Honor your body's natural preference for sleep timing
- Go to bed around the same time every night
- Set an alarm to wake you at the same time every day
- Maintain your sleep schedule, even after a poor night of sleep
- Develop an evening routine that minimizes screens and signals sleep, rest, and relaxation.
- Develop a morning routine that increases light and signals wakefulness



How to Start and End the Day

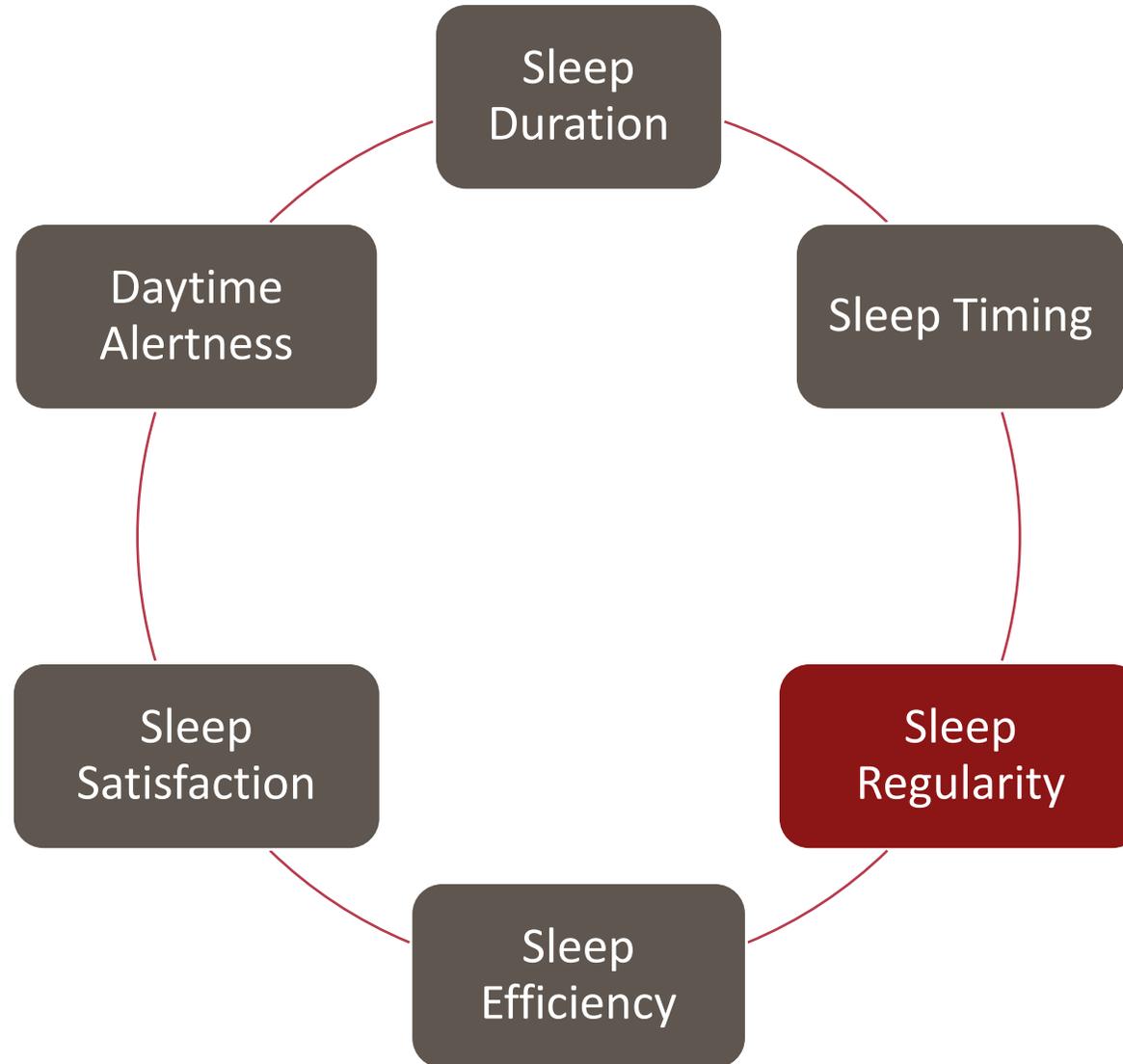


Bright light, some movement, and food



Early dinner, relaxing activities, and no screens

Sleep Health



What is Sleep Irregularity



Weekday to weekend variability



Night to night variability



Variability plus sleep loss

Physical and mental health outcomes

- Lower mood and well-being
- Poorer cognitive functioning
- Impaired daytime performance
- Greater obesity and inflammation
- Poorer cardiometabolic health
- Higher all-cause mortality

Why Does Sleep Irregularity Matter



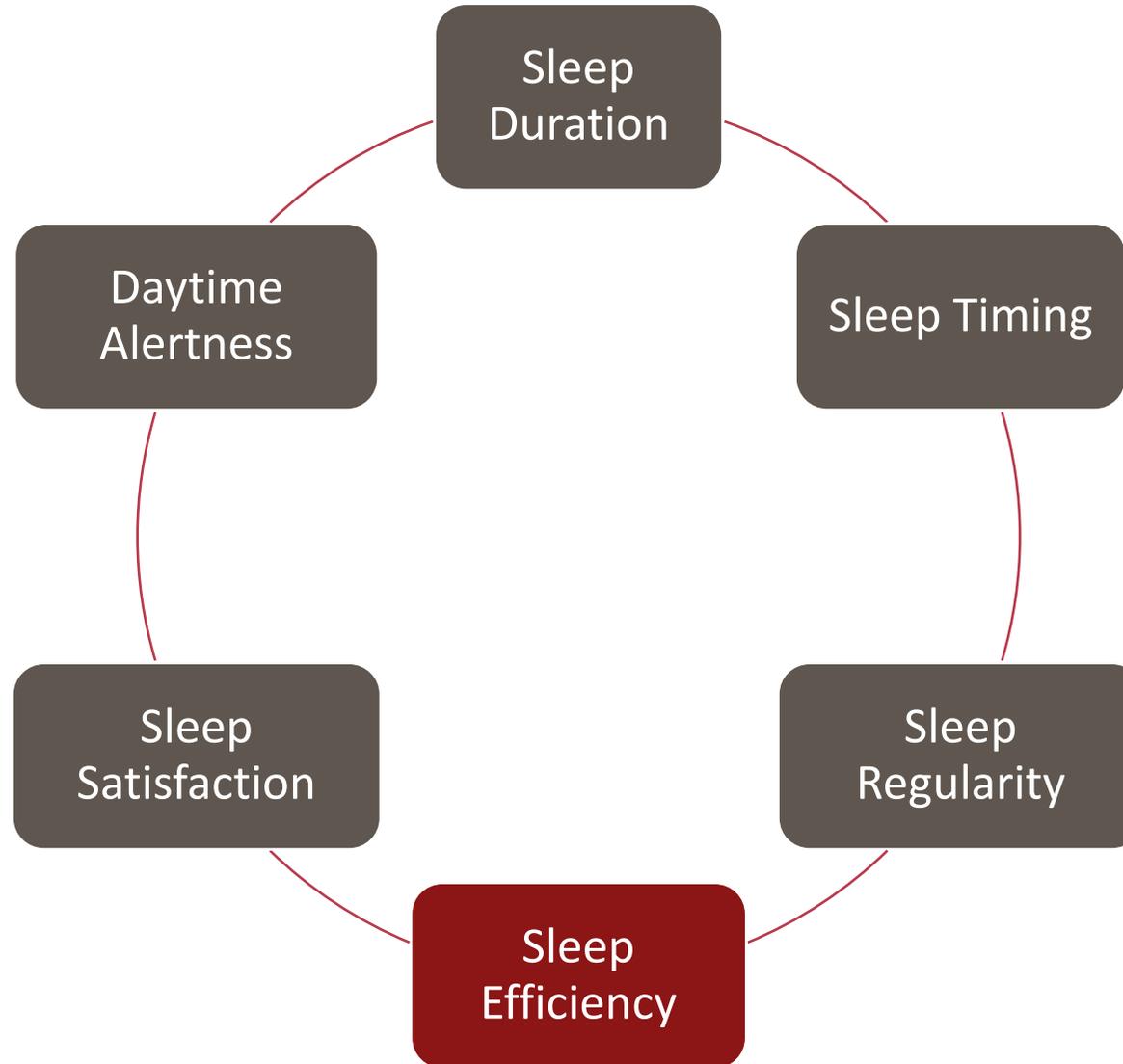
How to Reinforce Sleep Regularity

Circadian Zeitgebers

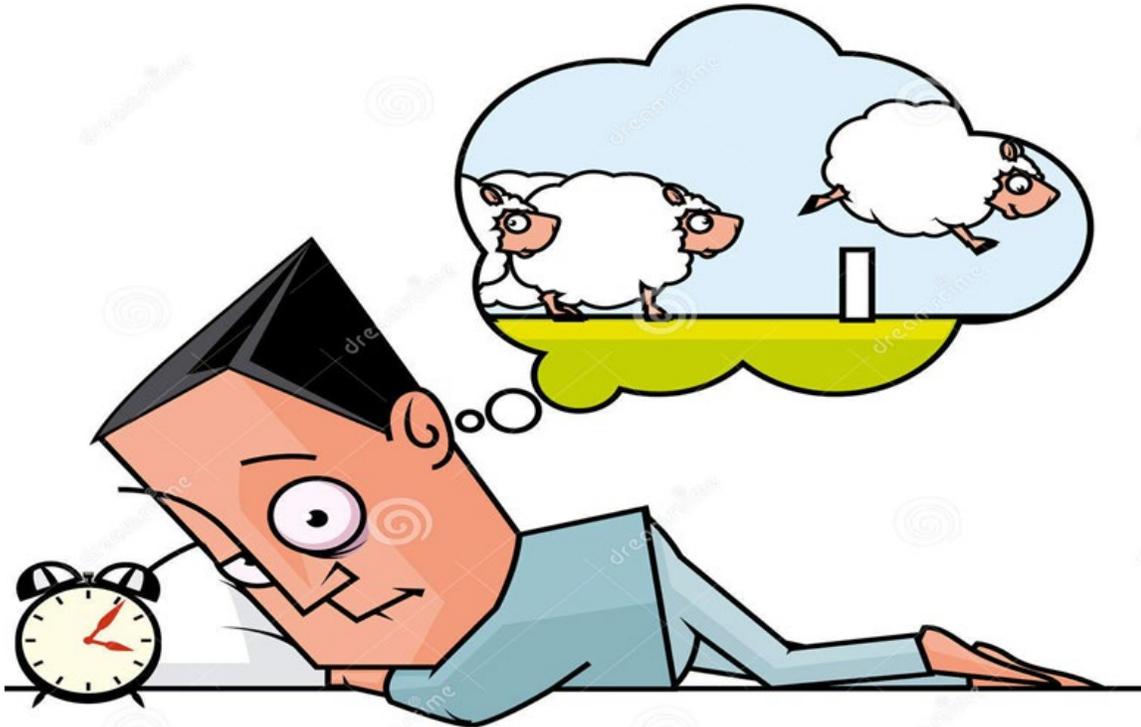
- Consistent morning wake time
- Relatively consistent evening bedtime
- Appropriately timed
 - Light-dark exposure
 - Food intake
 - Physical activity
 - Social activity
 - Use of stimulants (e.g., caffeine)
 - Use of sedatives (e.g., sleep aids)



Sleep Health

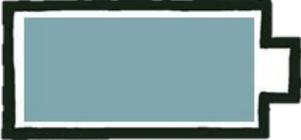


Insomnia is Inefficient Sleep



- Difficulty falling asleep, staying asleep, or waking up early unable to get back to sleep (>30 minutes).
- Occurring at least 3x/week for at least 3 months.
- Unable to sleep despite adequate opportunity and circumstances to sleep.
- Clinically significant daytime distress or functional impairment.

Insomnia is NOT Insufficient Sleep

	Insomnia	Insufficient Sleep
Sleep Opportunity	 ADEQUATE	 REDUCED
Sleep Ability	 REDUCED	 ADEQUATE

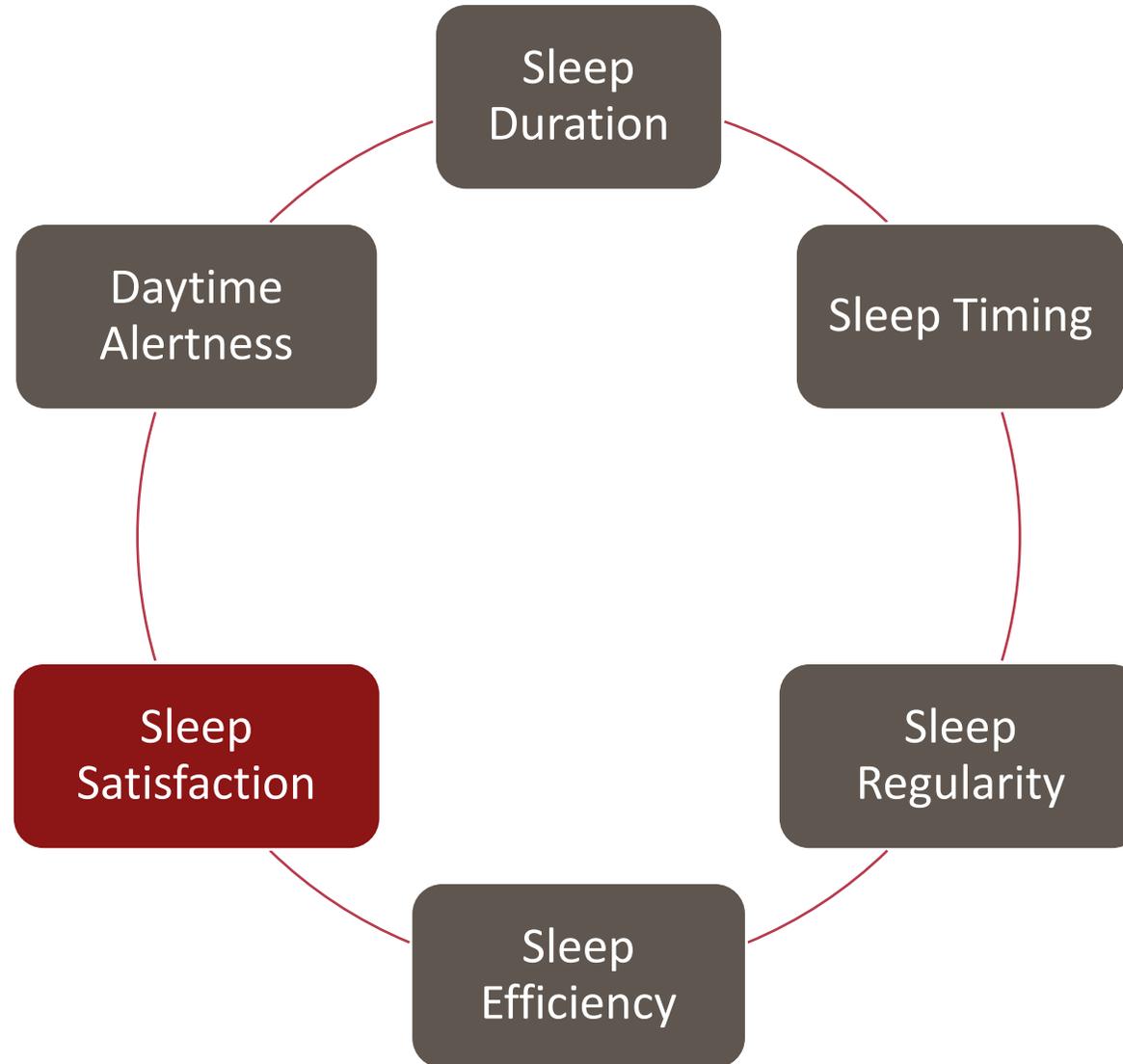
Spend the Right Amount of Time in Bed

Time in Bed vs.
Time Asleep



Spend LESS time in bed before spending MORE time in bed.

Sleep Health



Hyperarousal

Stress response

Physiological gas pedal

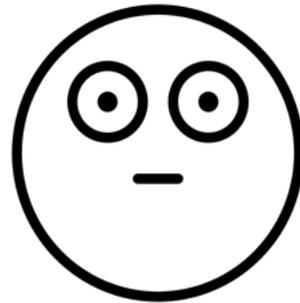
Sympathetic nervous system

↑ Heart + breathing rate

↑ Blood pressure

↑ Cortisol

Active mind + wakeful body



It is very difficult for sleep to happen in this state

Relaxation response

Physiological brake pedal

Parasympathetic nervous system

↓ Heart + breathing rate

↓ Blood pressure

↓ Cortisol

Calm mind + relaxed body



A relaxed state eases the transition into sleep



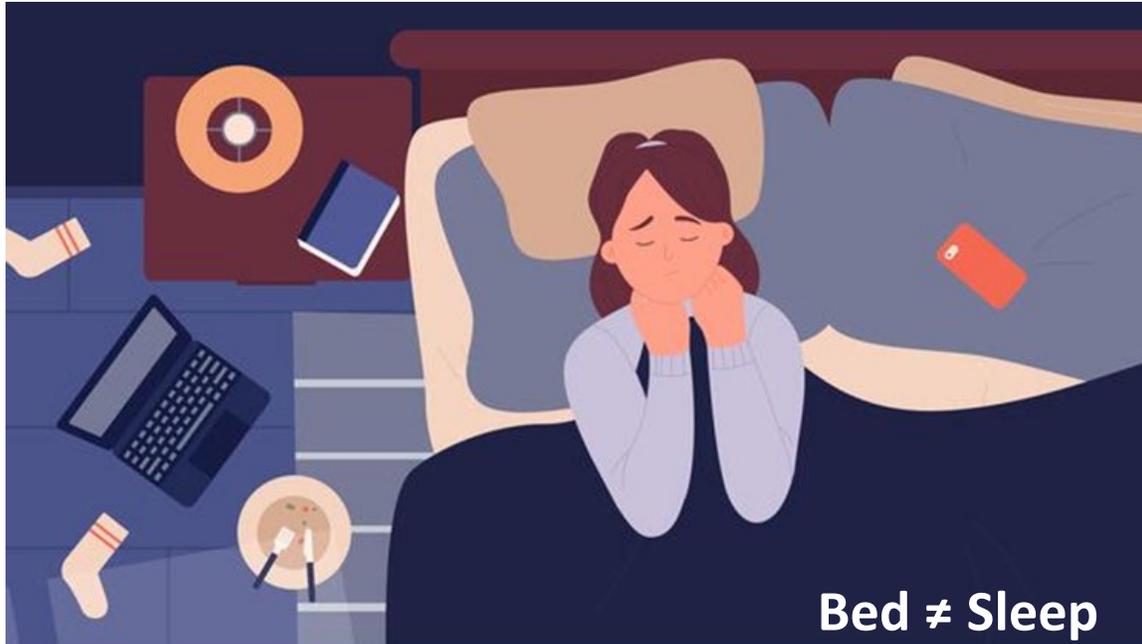
Calm the Mind, Relax the Body

- Diaphragmatic breathing
- Progressive muscle relaxation
- Positive visualization
- Body scan
- Mindfulness
- Self-compassion
- Restorative yoga
- Prayer

Reframe Unhelpful Thinking

- "I must get 8 hours of sleep to function the next day."
- "If I've had good sleep, I should wake up feeling refreshed."
- "I wake up a couple of times each night and fall back to sleep pretty quickly, but it can't be good for my sleep."
- "If I spend more time in bed, I will get more sleep and feel better the next day."
- "I need to try harder to sleep or to make up for lost sleep."
- "My sleep system is broken and cannot be fixed."
- "I didn't get enough sleep last night, so I'm too tired to do anything today."
- "There is nothing I can do to manage my sleep or the consequences of inadequate sleep except take a pill."

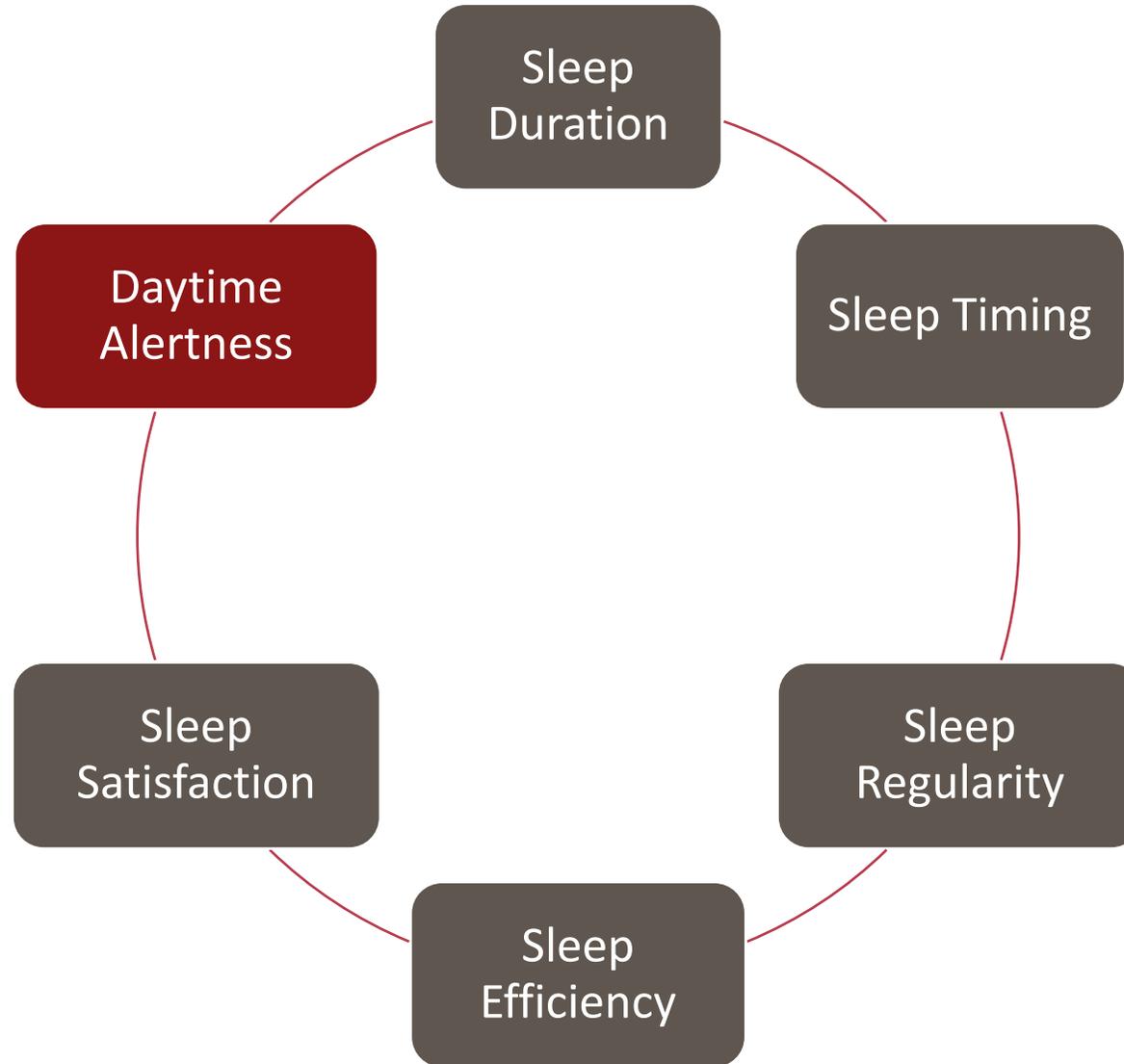
Reinforce the Association Between Bed and Sleep



Bed = Sleep

- Go to bed when sleepy.
- Get up at the same time every day.
- Do all wakeful activities outside of bed.
- Get out of bed if awake for >20 minutes at night.
- Use the bed (and bedroom) only for sleep and sex.

Sleep Health



Fatigue is NOT Sleepiness

	SLEEPINESS	FATIGUE
SIGNS	“Propensity to fall asleep”	“Feeling depleted/exhausted”
CAUSES	<ul style="list-style-type: none">• Higher sleep drive• Sedating medication• Cold, flu or other illness	<ul style="list-style-type: none">• Too much or too little activity• Stress, anxiety, depression• Boredom, eye strain• Alcohol hangover, caffeine crash• Low hormone or vitamin levels• Circadian effects• Infections• Medical / psychiatric conditions• Medication side effects

Reasons for Fatigue

Too much time in bed	Insufficient hydration
Medication side effects (prescription, over-the-counter, supplements)	Caffeine “crash”
Too much/little physical activity	Alcohol “hangover”
Too much/little social activity	Diet (high fat, high sugar, processed or gluten-rich foods)
Poor physical conditioning	Post-lunch circadian dip
Excess weight	Circadian misalignment
Boredom/repetitive tasks	Temperature (too hot or cold)
Chronic stress	Eye strain (reading/screens)
Negative mood	Hypervigilance re fatigue
Depression	Infections (e.g., flu)
Anxiety	Low iron, thyroid or vitamin D levels
Pain	Medical conditions (heart disease, sleep apnea)

Sleep and Comorbid Conditions

Sleep disorders:

- Obstructive sleep apnea, restless leg syndrome, periodic limb movements, circadian rhythm disorders, disorders of hypersomnolence

Medical conditions:

- Chronic pain, migraines, COPD, allergies, asthma, nocturia, GERD, IBD, hypertension, heart disease, diabetes, hypothyroidism, anemia, traumatic brain injury, neurodegenerative disease

Psychiatric conditions

- Anxiety, depression, bipolar disorder, posttraumatic stress disorder, psychosis, obsessive-compulsive disorders, eating disorders, substance use disorders, neurodevelopmental conditions (ASD, ADHD)



Behavioral Sleep Medicine is NOT Sleep Hygiene

Sleep Hygiene	Behavioral Sleep Medicine
<ul style="list-style-type: none"> • Avoid stimulants for several hours before bedtime. • Avoid alcohol for several hours before bedtime. • Exercise regularly but not too late. • Eat regularly but not too late. • Allow 1-hour period to unwind before bedtime. • Keep bedroom environment quiet, dark and cool. 	<ul style="list-style-type: none"> • Sleep and Circadian Education • Stimulus Control (bed re-association) • Sleep Restriction (sleep consolidation) • Relaxation Training • Cognitive Therapy • Sleep Hygiene • Circadian Strategies • Sleep in Sleep, Medical and Psychiatric Disorders
Guidelines	Individualized Multi-Component Intervention
Helps Normal Sleepers Maintain Healthy Sleep	Helps Individuals with Sleep, Psychiatric or Medical Disorders Improve Sleep and / or Resolve Sleep Problem

Sleep is not a performance...except when you are awake.



Sleep Health Strategies

- Learn how sleep, circadian and stress response systems work.
- Sleep at the right time for your body clock.
- Limit your time in bed to the right amount for your age and individual sleep need.
- Keep a consistent sleep schedule, especially morning rise time.
- Do not nap / doze or limit napping to ≤ 30 minutes at least 7-9 hours before time.
- Spend 10-15 minutes in the morning getting light exposure and moving around.
- Spend 30-60 minutes before bedtime in dim light doing activities that you find relaxing and enjoyable.
- Stop all screens and put away digital devices at least 1 hour before bedtime.
- Challenge extreme, overly negative, unhelpful thoughts about nighttime sleep and daytime consequences.
- Align other circadian rhythms with sleep-wake pattern (e.g., light-dark, feeding-fasting, rest-activity).
- Find parasympathetic relaxation exercises that you enjoy and practice them regularly e.g., diaphragmatic breathing.
- Sleep only in bed and do wakeful activities elsewhere.
- Engage in regular cardiovascular activity.

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Thank You

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