Chronic Pain : Interventions from 9-5

Bill Davies RRT, PAC

Disclosure

- No Industry Connections to report

- What do “you” know about Pain?
- Pain’s Multidimensional, Bidirectional Linked Dilemmas
- Options for Changing Addicting Behaviors, BBT

What do “you” know about Pain?

- Varied Presentations
- Complex Painful Disorders
- Treatment Complexities
- Contributing physiological issues
- Confounding behavioral sequala
- Patient’s understanding is difficult: ? wants/needs
- Bidirectional with All Bodies System

Pain Is

Bottom –Up and Top-down Mechanism (Bidirectional)

Processing and Over Processing (Multidimensional)

Triggers of : Autonomic & Neuroendocrine Pathways
Sympathetic & Parasympathetic Systems

Immune & Inflammatory Responses

Is Protective In Acute Pain

Yet becomes a Brain Cortex Impairment Disorder Once Chronic

Chronic Pain Becomes a Processing Disorder Which The Brain Attempts To Modulate

Affective component: YOUR FEELINGS /EMOTIONS (fear, worry, anger, resentment)

Sensory Component: How Pain is Felt

Cognitive Component: What You Think (Is It Temporary, Permanent, Controllable Or Curable)

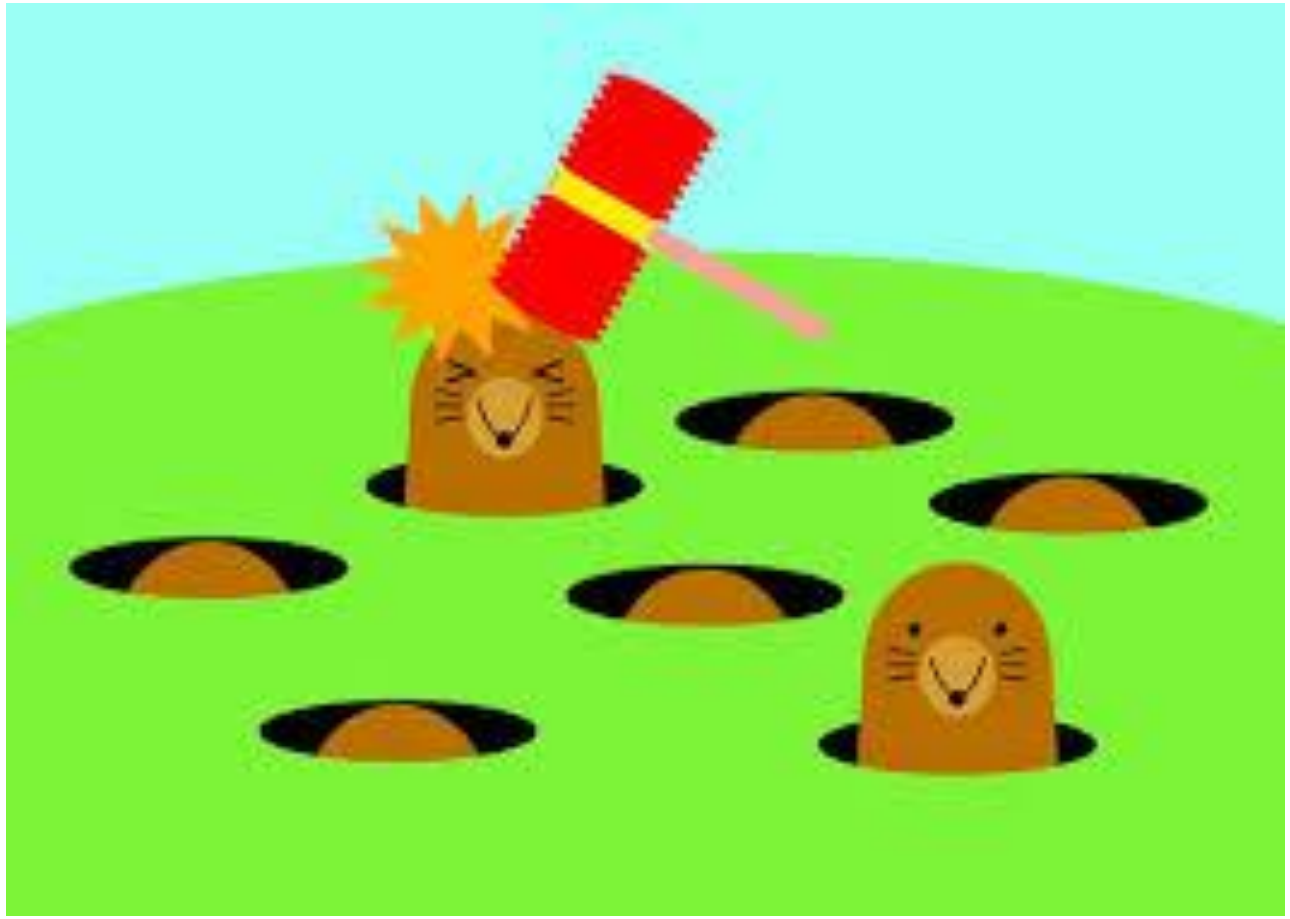
- Multidimensional involvement of all body systems

Biochemical Pharmacology of Pain.
Neurotransmitters, Receptors, and Structures

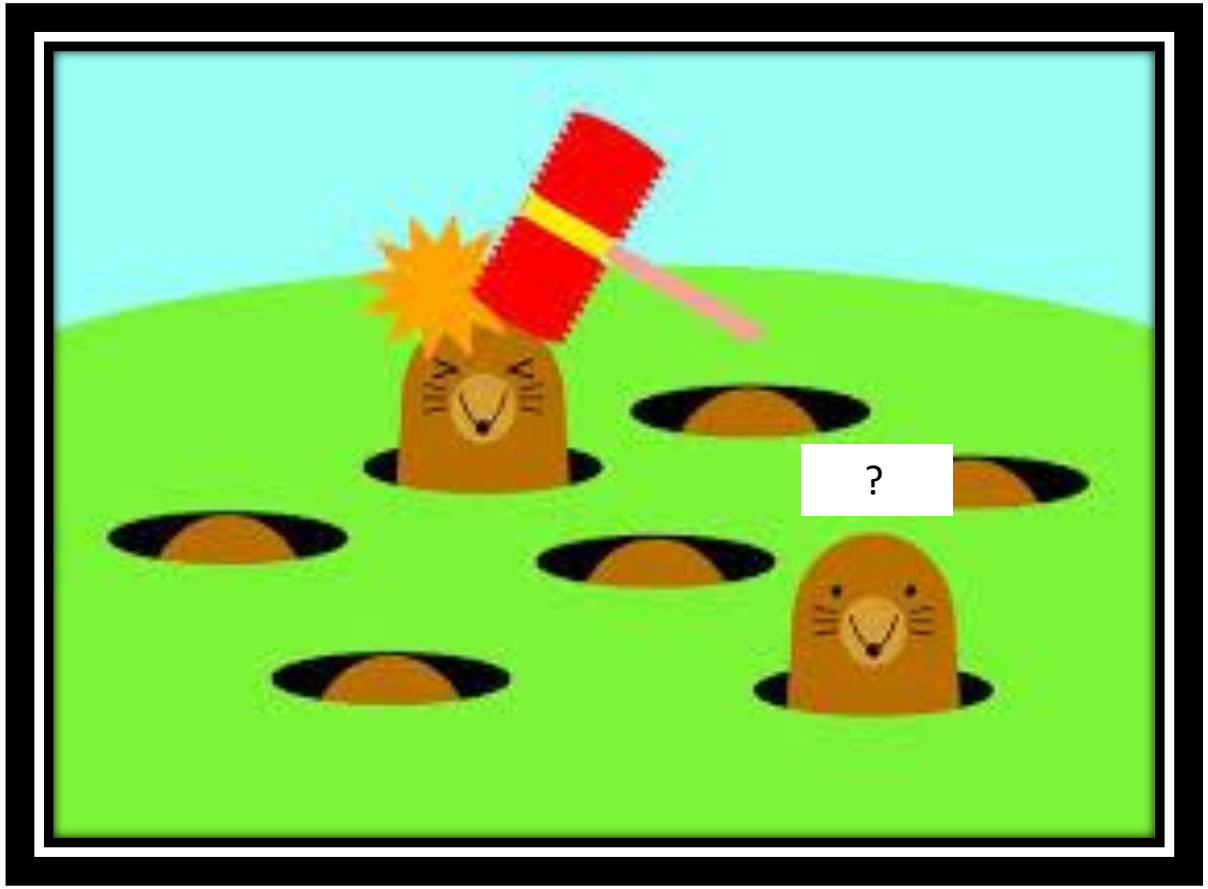
- Corticolimbic structures
  - Prefrontal cortex
  - Anterior cingulate cortex
  - Amygdala
  - Hippocampus
  - Limbic

- Glutamate
- GABA
- Opioid peptides
- IL- 6
- Cannabinoids
- Leptin
- Orexin
- Melatonin
- Others

Treating Pain Issues is like this Game



What Essential Body Function is linked to all pain?



Pain and Sleep Issues Bidirectionally Impact Each other

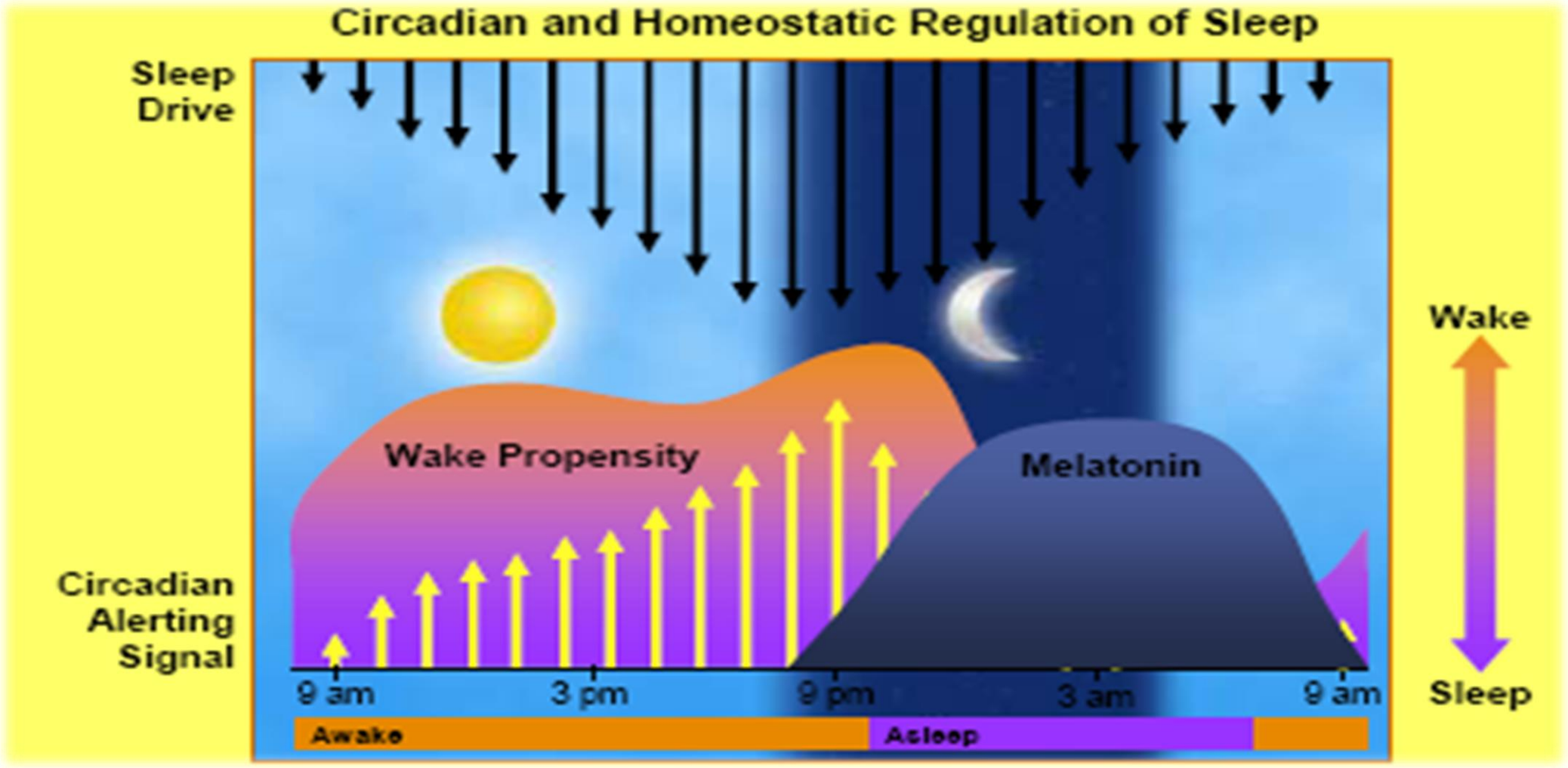
What do “you” know about Sleep Issues?

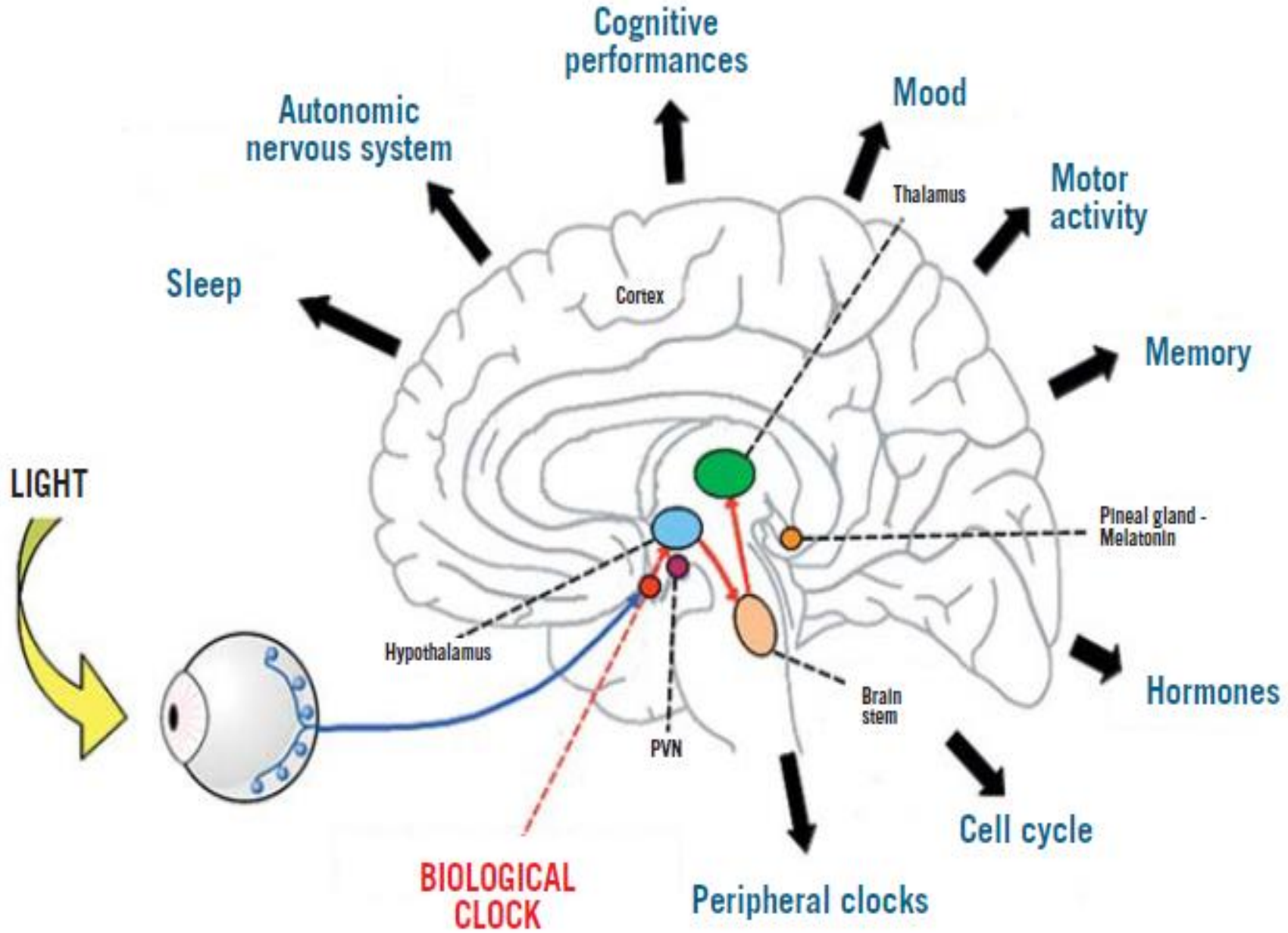
- Varied Presentations
- Many Complex Disorders
- Treatment Complexities
- Contributing physiological issues
- Confounding behavioral sequala
- Patient’s understanding is difficult: ? wants/needs
- Bidirectional with All Bodies System

Sleep is:

- A periodic, rapidly reversible **neuro- behavioral state**
- Characterized by firing of central nervous system, neurons and circuits
- Impacted by environmental, behavioral, neurobiological systems, pain and genes
- Sleep is neuroprotective through increased glympathics system flush

Sleep Wake Cycle




Cognitive performances
Mood
Autonomic nervous system
Thalamus
Motor activity
Sleep
Cortex
Memory
LIGHT
Pineal gland - Melatonin
Hypothalamus
Brain stem
Hormones
PVN
Cell cycle
BIOLOGICAL CLOCK
Peripheral clocks

Biochemical Pharmacology of Sleep

Receptors, Neurotransmitters and Neuropeptides

Dopamine
Norepinephrine
Histamine
Acetylcholine
Serotonin
Interleukin-1
Adenosine
Prostaglandins
Melatonin
Neuropeptides
GABA
Orexin

Acetylcholine Receptors
Muscarinric Receptors
Nicotinic Receptors
Adrenergic Receptors
Serotoninergic Receptors

Biochemical Pharmacology of Pain
Receptors, Neurotransmitters and Neuropeptides

- Corticolimbic structures

- Prefrontal cortex
- Anterior cingulate cortex
- Amygdala
- Hippocampus
- Limbic

- Glutamate
- GABA
- Opioid peptides
- IL- 6
- Cannabinoids
- Leptin
- Orexin
- melatonin

Understanding this Sibling Rivalry

Sleep Disorders Worsen Pain

- neuropathic,
- musculoskeletal,
- headache/migraine,
- idiopathic pain disorders
- Fibromyalgia
- PTSD
- **Promote Addictive Behaviors**

Pain Disorders Worsen Sleep Regulation

- Circadian Rhythm Dysregulation
- Fatigue, Anxiety, Depression, Insomnia
- Restless Legs
- Parasomnias
- Sleep Breathing Disorders
- **Promotes Addictive Behaviors**

Linked Dilemmas?

Pain/Disorders

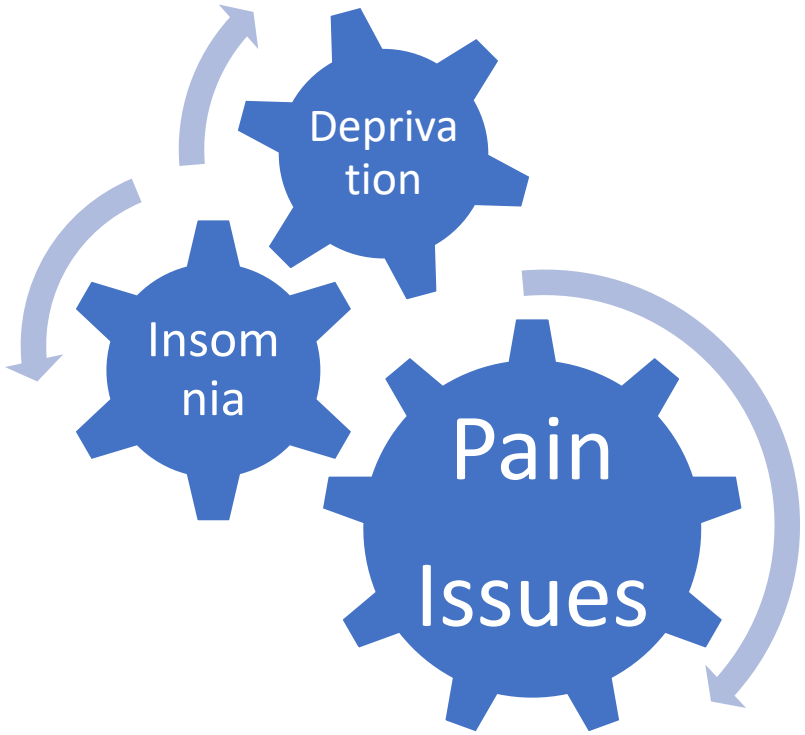
- Varied Presentations
- Complex Painful Disorders
- Treatment Complexities
- Contributing physiological issues
- Confounding behavioral sequala
- Patient understanding difficult: ? wants/needs
- Bidirectional with All Bodies System

Sleep/Disorders

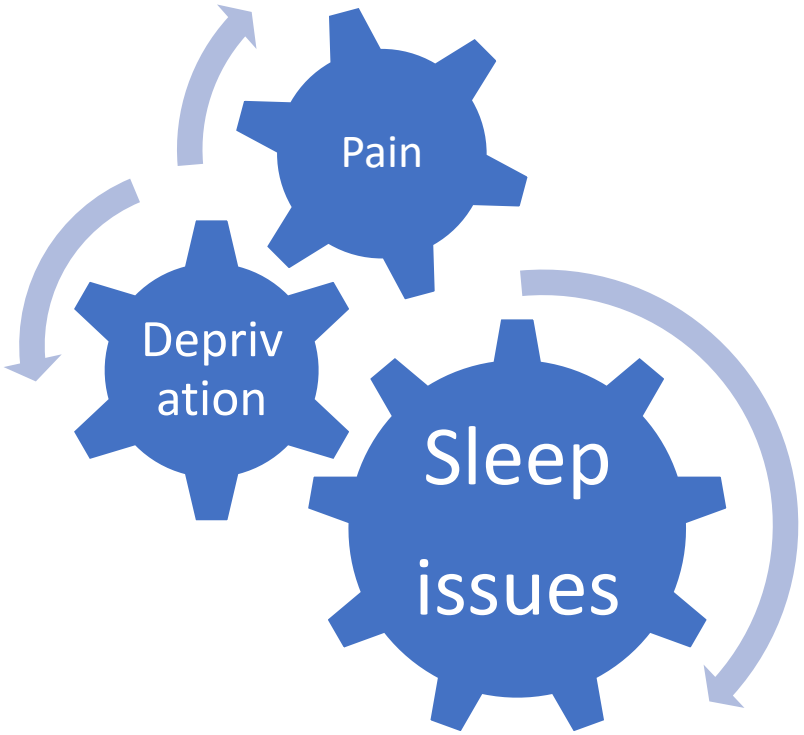
- Varied Presentations
- Many Complex Disorders
- Treatments are Complex
- Contributing physiological issues
- Confounding behavioral sequala
- Patient understanding difficult: ? wants/needs
- Bidirectional with All Bodies System

Changes in Bidirectional Perceptions

Past



Current



Sleep Dysregulation/Deprivation

Sleep-Wake Disorders and Chronic Pain: Reciprocal and Interactive Effects

As the patient spend more time in Bed

- **Basic circadian cycle is disrupted**
- **Basic physiologic rhythm of sleep is** lost

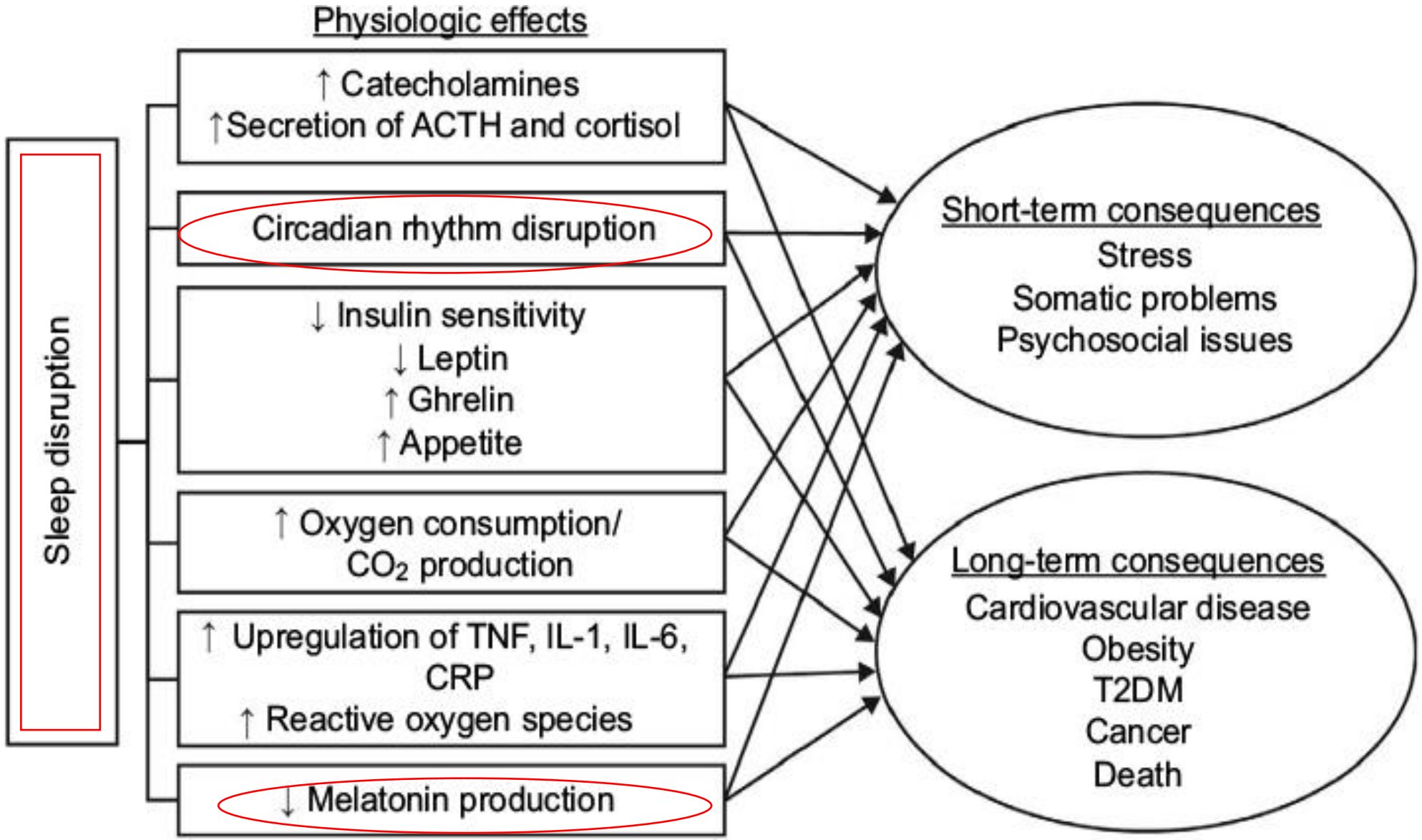
Lack of movement and sleep leads to

- more pain
- further sleep disruption
- dysphoria
- more fatigue.
- Sleep deprivation produces hyperalgesia changes according to most studies

Circadian Rhythm Disruptors

- Cancer
- Alcohol
- Poor liver function
- Leaky Gut
- Depression
- Melatonin Production
- Shift work
- Loss of Sleep wake regulators
- Altered adenosine levels
- Pain
- Irregular metabolism in the day/night
- Micro awakening
- Altered sleep REM/SWS structures
- Parasomnia
- Snore, SRBD
- Insomnia
- Traumatic Disorders

Sleep Dysregulation's Impact



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PMCID: PMC6879497
PMID: 31207606

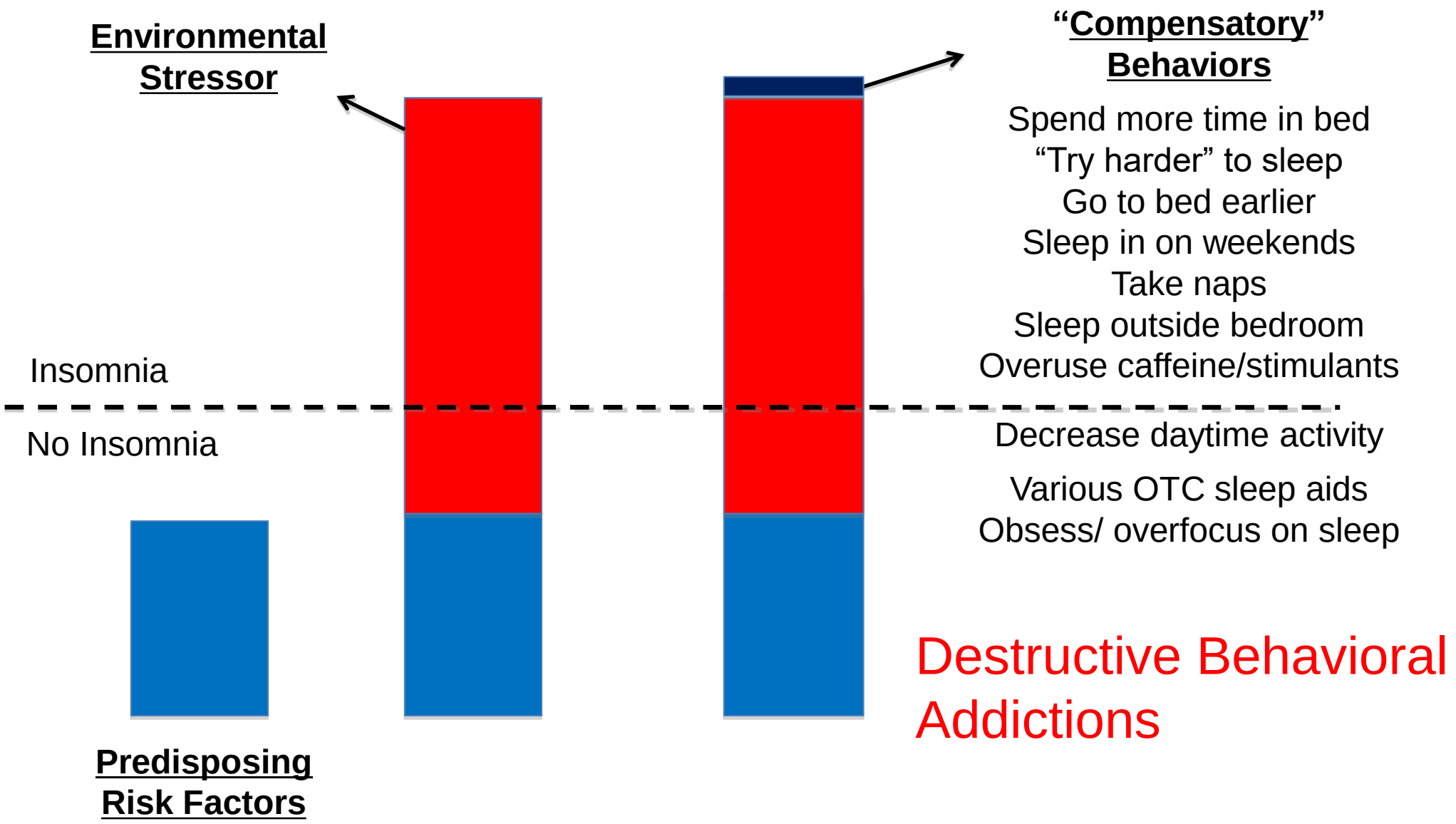
Sleep deficiency and chronic pain: potential underlying mechanisms and clinical implications

Analgesic
Opioid system
↓ Responsivity to opioids
Monoaminergic - Dopamine
↓ Dopamine D2 receptor activity
Monoaminergic - Norepinephrine
↑ Norepinephrine transporter mRNA in LC, norepinephrine levels in blood
Orexin signaling
↓ Orexin-A in hypothalamus, plasma, bone marrow
↑ Orexin-A in hypothalamus, LC, cortex, CSF
Melatonin
↓ Melatonin levels in blood (mediated through light exposure at night)
Endocannabinoids
↑ Endocannabinoids in blood

Analgesic and/or Hyperalgesic
Monoaminergic - Serotonin
↓ Serotonin 1A receptor sensitivity
↑ Extracellular serotonin in basal forebrain
↑ Plasma serotonin metabolites
HPA axis
↑ Cortisol (indirect effects on pain through interplay with immune system)

Hyperalgesic
Adenosine signaling
↑ Adenosine (A2A receptor mediated)
Nitric oxide signaling
↑ NO in basal forebrain, PAG, cortex
Immune system
↑ Prostaglandins (PGE2)
↑ Cytokines (IL-1, IL-6, TNF)

System/mediator property:	Effect of sleep deficiency on system/mediator:
Analgesic	↑ Activating
Analgesic/hyperalgesic	↓ Deactivating
Hyperalgesic	



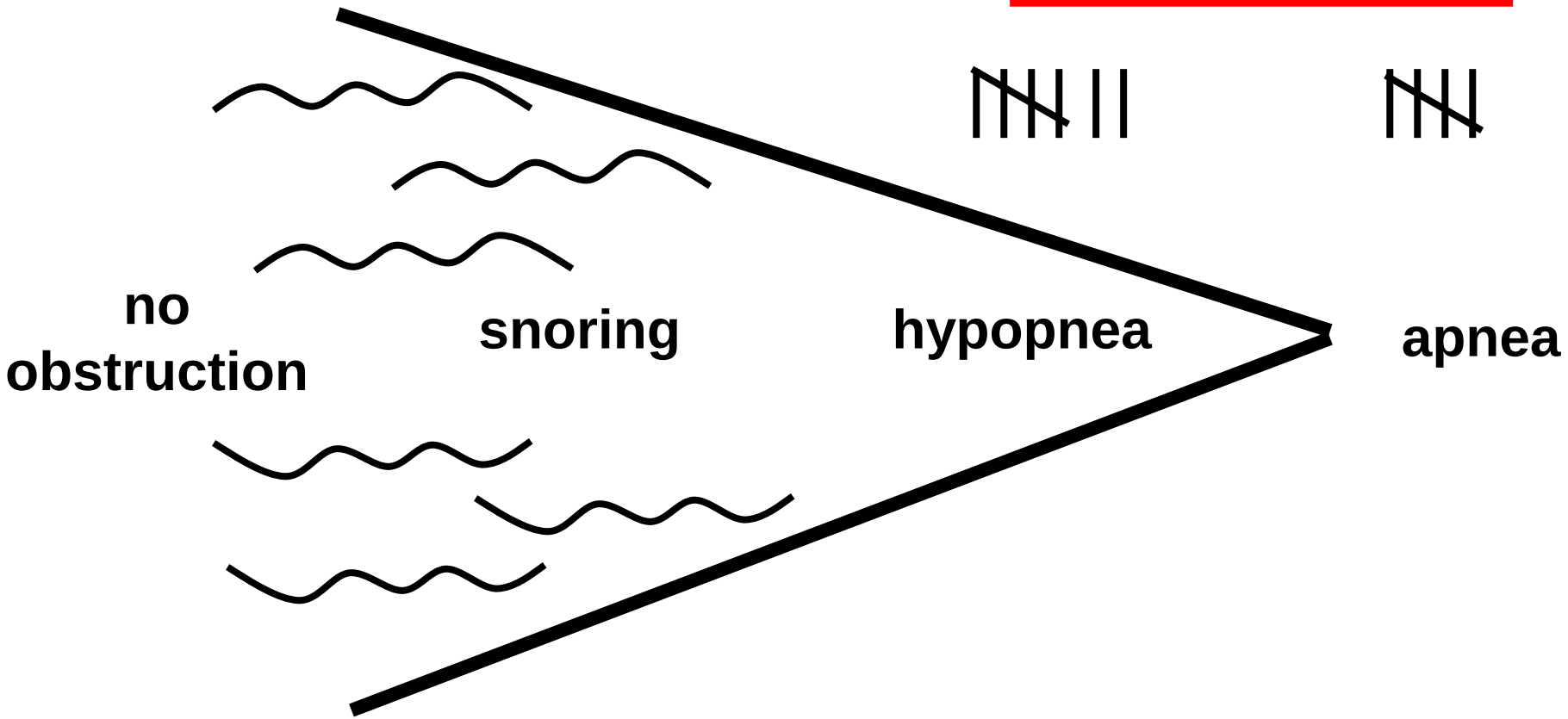
Destructive Behavioral Addictions

Spielman, 1987

Sleep Related Breathing Disorders

UARS
flow-limited breaths
***subtle detection**

AHI (OSA only)
<5 none
5-14 mild
15-29 mod
30+ severe




LOST
VERY LOST

Medical Practices are in part Behavioral Health

Addictive Behaviors share key Neurobiological features

- **Involve pathways of reward and reinforcement by:**
  - neurotransmitter dopamine and prefrontal cortex
- **Brain's learning mechanism** (conscious/unconscious)
- **Mental health issues**
  - Likely accompany
- **Often accompany**
  - undiscovered health conditions
- **Cognitive drives:**
  - Past Memories, rewards and motivations
- Continued to be pursued despite
  Physical and psychological harm

How do you Que up both Sleep/Pain patients
pre and post pain onset

Sleep/Pain History (**before and current)**

- Sleep Disruptors History
- Insomnia history pre-post
- Sleep Breathing history pre-post
- Daytime/night time routine history
- Meal/Eating timing history

Pre Visit/Office Support

- Short simple questionnaires
- Staff intake interviews
- Cognitive Behavior Therapy (BBT)

INSOMNIA SCREENING QUESTIONNAIRE

- Is a screening tool used to guide the providers in the clinical evaluation of primary sleep disorders and insomnia.

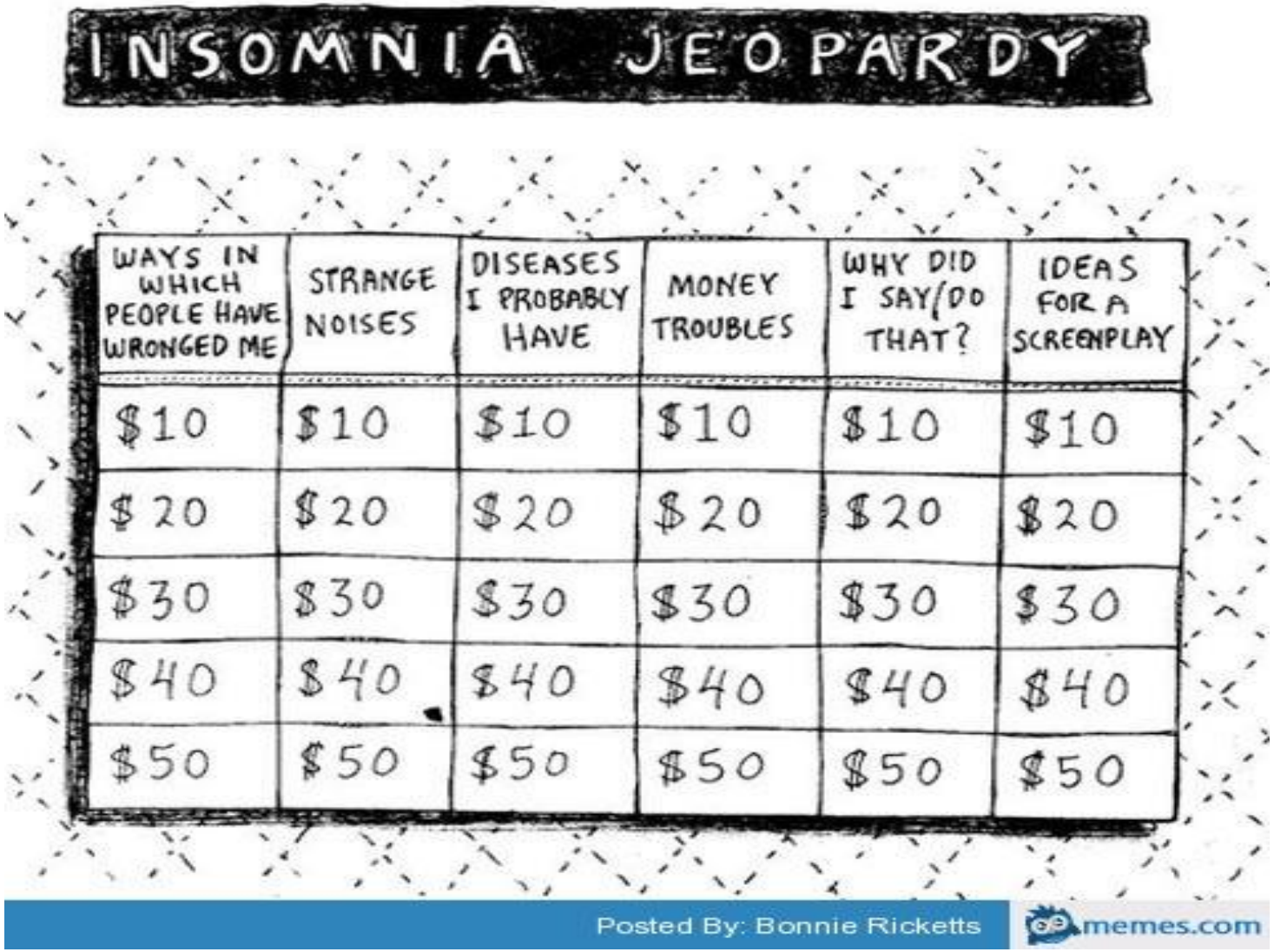
Diagnostic Domains:

1) Insomnia: Q1-6 2)
2) Psychiatric Disorders: Q7-10 3)
3) Circadian Rhythm Disorder: Q11 4)
4) Movement Disorders: Q12-13 5)
5) Parasomnias Q14 6)
6) Sleep Disordered Breathing (Sleep Apnea): Q15-17

insomnia screening questionnaire - JPS Health Network https://www.jpshealthnet.org/sites/default/files/insomnia_screening_questionnaire.pdf

CBT/BBT: Event => Thoughts => Feelings => Behaviours

Skills change behaviors meds do not


INSOMNIA JEOPARDY
WAYS IN WHICH PEOPLE HAVE WRONGED ME
STRANGE NOISES
DISEASES I PROBABLY HAVE
MONEY TROUBLES
WHY DID I SAY/DO THAT?
IDEAS FOR A SCREENPLAY
$10 $10 $10 $10 $10 $10
$20 $20 $20 $20 $20 $20
$30 $30 $30 $30 $30 $30
$40 $40 $40 $40 $40 $40
$50 $50 $50 $50 $50 $50
Posted By: Bonnie Ricketts
memes.com

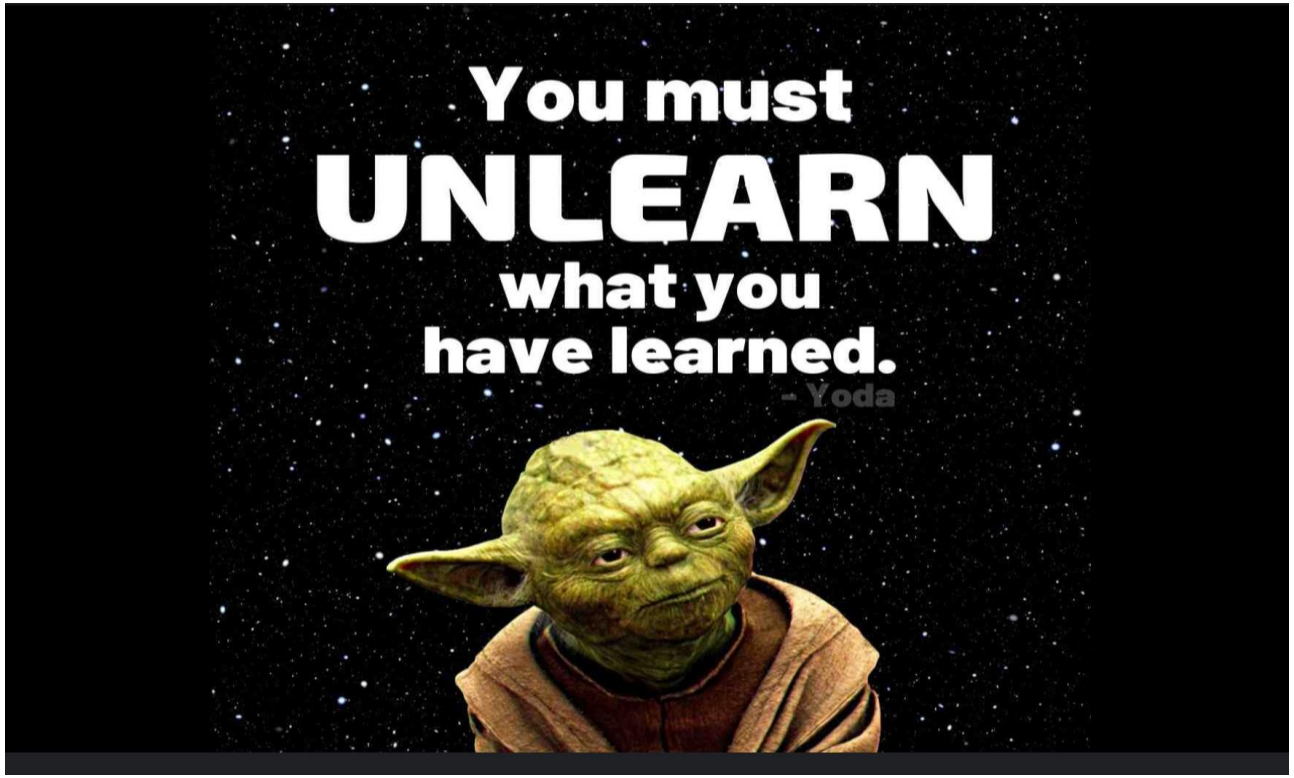
(Audience Jeopardy)

He was in Star Wars with Luke Skywalker.

He quoted this:

“You must unlearn what you have learned”

Who is Yoda?



Behavioral Therapies at work

- Paradoxical intention
- Cognitive restructuring
- Imagery training (ABC)

- Explicit instruction to stay awake when they go to bed
  - Aim is to reduce anxiety associated with trying to fall asleep
- Alter irrational beliefs about sleep
  - provide accurate information that counteracts false beliefs
- Patient imagines 6 common objects (candle, kite, fruit, hourglass, blackboard, light bulb) emphasis on imagining shape, colour, texture

Thought Stopping
Words create pictures in the conscious/unconscious

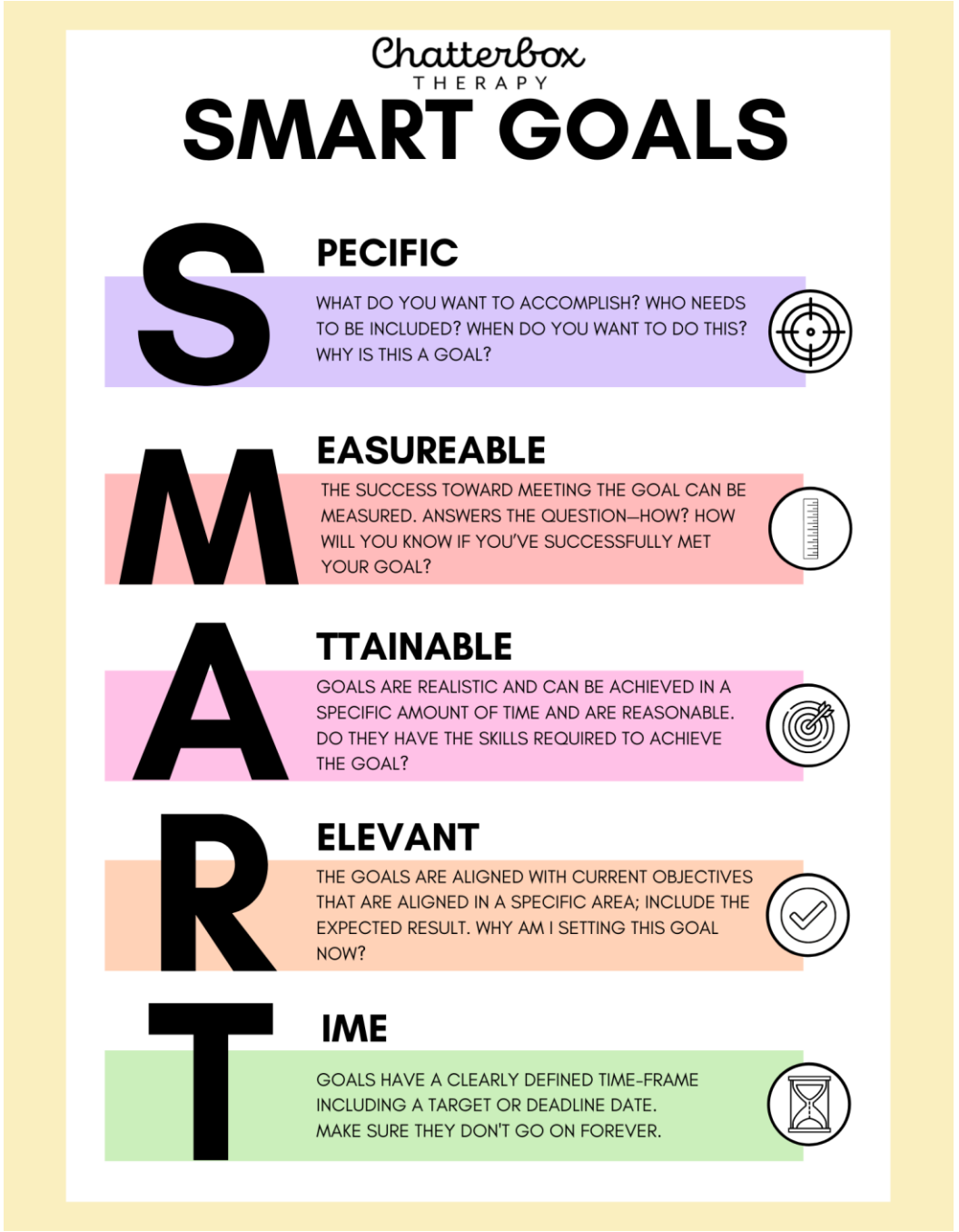
- Interrupt unwanted pre-sleep cognitive activity:
  - repeat sub-vocally 'blue dog' every 3 sec (articulatory suppression)

- To yell sub-vocally and vocally "stop" 

(thought stopping)

- Create progression of images linked to letters or numbers (A - apple)

A goal without a plan is a wish.



SLEEP HYGIENE PRACTICES

Medical journals and sleep experts have identified certain habits that negatively affect sleep and others that improve it. Follow some of these sleep hygiene tips to make the best out of your time sleeping.

01 Go to sleep at the same time every night

02 Keep daytime naps below 20 minutes

03 Avoid phones and other electronic screens at least 30 minutes before bedtime

04 Keep your bedroom pitch black at night

05 Maintain your bedroom temperature between 60°F and 67°F

06 Only use your bed for sleep and sex

07 Wear socks to help signal the body that it's bedtime

08 Avoid large meals before sleeping

09 Add some white noise to your bedroom

10 Avoid alcohol and narcotics

For the full list of updated sleep hygiene practices to sleep better, visit

RestedLife.com

Sleep Environments: What the ears hear and body feels

65-67

THE SOUND RAINBOW

Some noises, like doors slamming or dogs barking, can interrupt rest or concentration, while other sounds can help you relax, clear your mind, and promote better sleep.

WHITE NOISE

White noise is made up of all frequencies that are audible to the human ear. Energy is equally distributed across these frequencies, and this equal distribution creates a consistent humming sound.

USE IT FOR

Sound masking
Managing tinnitus
Increasing concentration
Improving sleep and relaxation
Enhancing privacy

PINK NOISE

Pink noise consists of all frequencies that are audible to the human ear, but energy is not equally distributed across them. The energy is more intense at lower frequencies, which makes it deeper than white noise.

USE IT FOR

Falling asleep faster
Staying asleep longer
Blocking disruptive noises
Improving memory

YOGASLEEP

BROWN NOISE

Sometimes referred to as red noise, brown noise has higher energy at lower frequencies and is deeper and stronger than white noise. However, brown noise and white noise sound similar to the human ear.

USE IT FOR

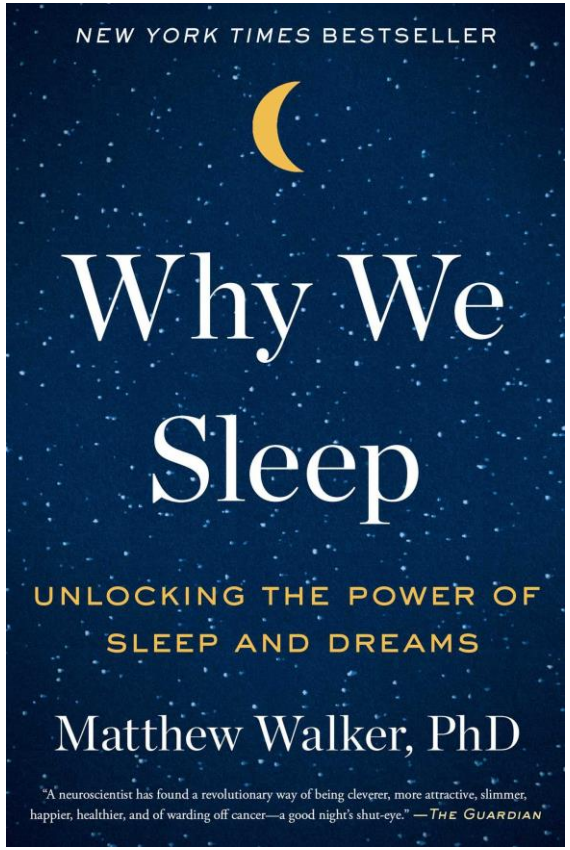
Relaxation
As a sleep aid
Noise-blocking
Improved focus

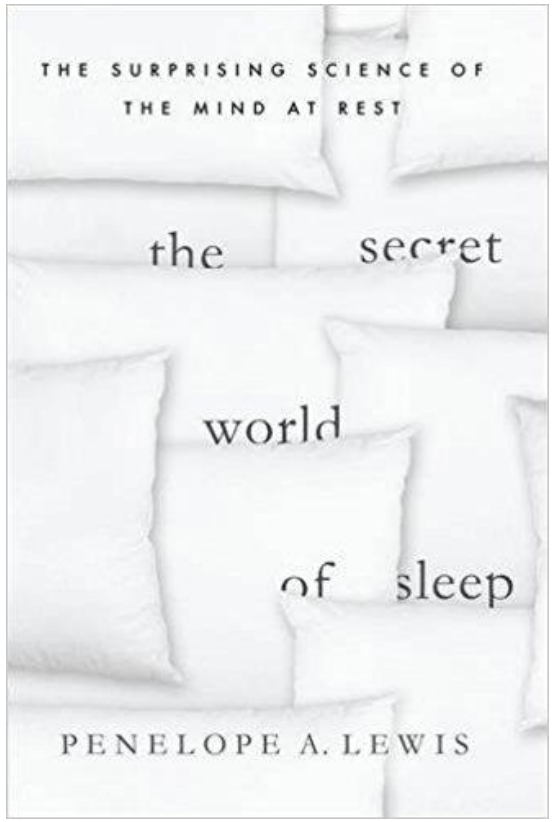
YOGASLEEP.COM • https://yogasleep.com/blogs/give-sleep-a-chance-blog/pink-noise-the-full-sound-spectrum

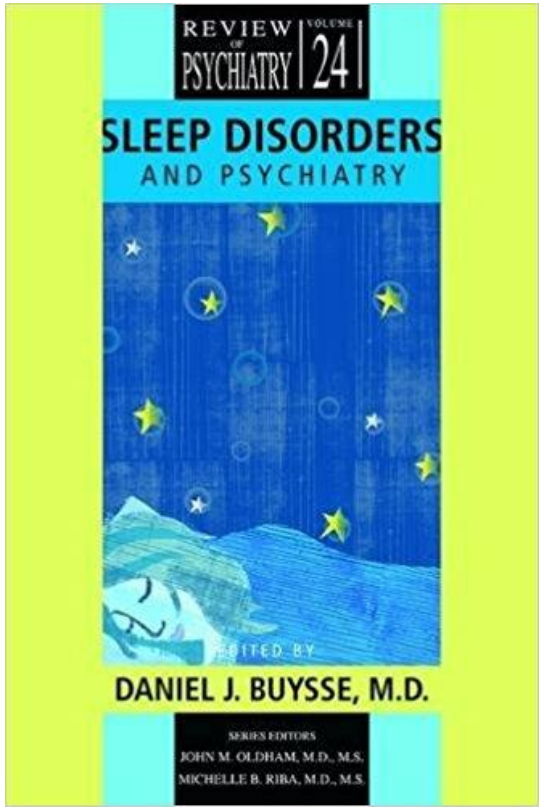
Take home points: “Interventions often need to begin with you”

- Sleep deprivation and circadian disruption predisposes individuals to
  - future and or worsening pain control,
  - impaired cognitive function,
  - metabolic dysregulation and
  - confounding addictive patterns.
- Suspect it in all pain disorders
- Sleep disturbances can complicate the course of recovery from pain and substances.
- Non-pharmacologic intervention:
  - Brief Behavioral Therapy (BBT) effective in reducing acute and chronic pain conditions.
- Sleep consults are warranted but may take time. (3-6 months)

Your now up to the Game


NEW YORK TIMES BESTSELLER
Why We Sleep
UNLOCKING THE POWER OF SLEEP AND DREAMS
Matthew Walker, PhD
"A neuroscientist has found a revolutionary way of being cleverer, more attractive, slimmer, happier, healthier, and of warding off cancer—a good night's shut-eye." —THE GUARDIAN


THE SURPRISING SCIENCE OF THE MIND AT REST
the secret world of sleep
PENELOPE A. LEWIS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SLEEP DISORDERS AND PSYCHIATRY
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DANIEL J. BUYSSE, M.D.
SERIES EDITORS
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MICHELLE B. RIBA, M.D., M.S.


The Success Elite
"MIND WHAT YOU HAVE LEARNED. SAVE YOU IT CAN."
- Yoda

Any Questions?

Bill Davies, PAC, RRT

"Rover really put up a battle last night, dear, when I put him out."