Pain Neuroscience: Education without stigma

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UW Medicine

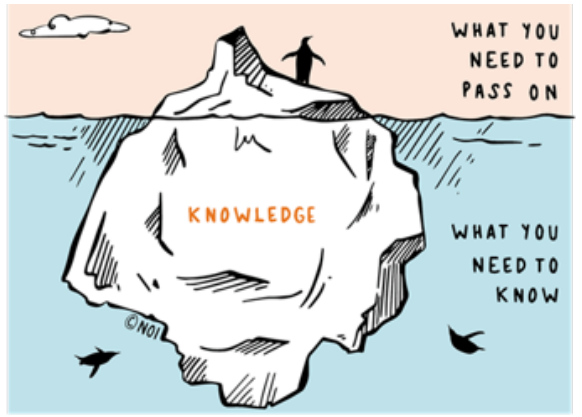
Speaker Disclosures

- The presenters of this session have NOT had any relevant financial relationships.
  - The presenters of this session DO hold the following beliefs:
    - All pain is real, and all pain is a biopsychosocial experience.
    - The more people understand chronic pain the better treatment outcomes they have.
    - Hurt ≠ Harm.
    - Pain = Protection.
    - Pain is complex and everything matters when it comes to chronic pain.
    - Recovery is possible.

Learning Community Overview

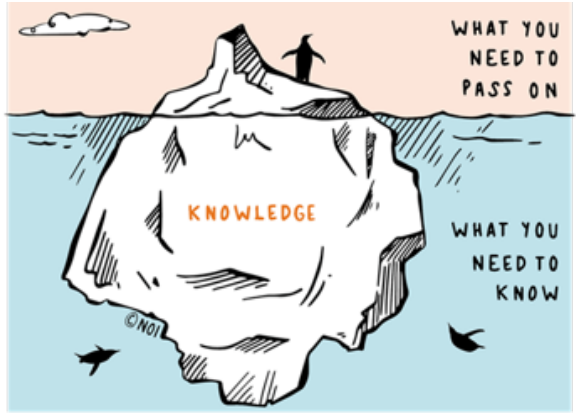
- Session 1: Pain Neuroscience Education (PNE)
- Session 2: Cognitive Behavioral Therapy for Chronic Pain (CBT-CP)
- Session 3: Acceptance and Commitment Therapy for Chronic Pain (ACT-CP)
- Session 4: Pain Reprocessing Therapy (PRT) and Emotional Awareness and Expression Therapy (EAET)

PNE Training Objectives



1. Deepen understanding of pain neuroscience.
2. Build skills in empowering patients through pain neuroscience education.
3. Increase comfort and ability to engage patients in conversation regarding the different types of pain we experience.
4. Increase understanding of the mechanistic rational behind pain self-management strategies.
5. Review resources available to healthcare practitioners and consumers.

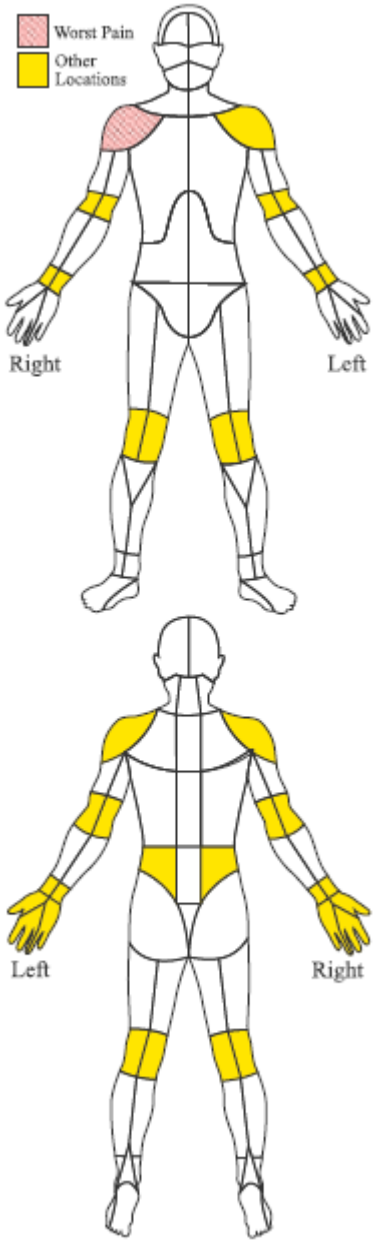
Poll



How comfortable are you talking to your patients about pain and providing pain neuroscience education?

A Tale of Long COVID

- Late 20's Caucasian male with no prior pain history - longstanding/untreated depression and anxiety
- Acute COVID vaccine reaction in 2021
  - All joints were "on fire" with fever, headache, nausea - symptoms resolved <24 hours
- 2 months later onset of L knee pain while using bike. 2 weeks later onset of R knee pain without activity.
- No acute injury or accident
- Progressive spread to involve multiple joints - multiple specialty visits including sports medicine, physical therapy, surgical consult, rheumatology
  - Diagnosed with Hypermobile Ehler-Danlos Syndrome (EDS) by rheumatology
- 2024: Experiencing diffuse polyarthralgia (joint pain), myalgia (muscle pain), and nociplastic (centralized) pain



The lemon

Questions for breakout

- Based on your current knowledge....
  - What questions do you have about this case?
  - How would you start with this individual?
  - How would approach educating this individual about their pain?

OR…

- In your current role/setting...
  - What challenges are you experiencing working with people experiencing chronic pain?

Breakout discussion (5 min.)

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Discussion and The Seven Target Concepts of PNE

- There are many potential contributors to anyone's pain
- We are all bioplastic
- Pain is not an accurate marker of tissue state
- Pain education is treatment
- Pain is a brain output
- Pain is a protector
- Pain can become overprotective/sensitized.

Lofty Summit; Leake et al., in preparation

Pain Neuroscience Education

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Defining pain – danger vs safety

- Pain is a perceptual experience produced by the brain to draw our attention to potential danger.
  - It is the alarm, not the fire.
  - Its purpose is to get our attention and act to avoid danger.

- Pain is a powerful learning mechanism, one exposure may change behavior.
  - Our nervous system's job is to keep us alive.
  - Danger and error detecting machine.
  - Negative bias.

Defining (Chronic) Pain

An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage. (International Association for the Study of Pain, 1994)

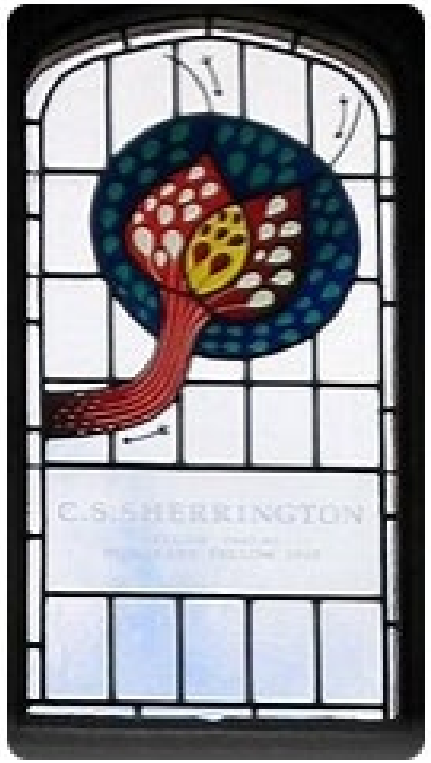
Acute Pain

- Hurt = Harm
  - Useful warning signal
  - Avoidance often decreases damage
- Etiology
  - Often clear pathway/single cause
  - Symptoms reflect disease etiology
- Treatment course
  - Cure focused
  - Short-term
  - Biomedical focus

Chronic pain (pain persisting longer than 3 months)

- Hurt ≠ Harm
  - False alarm
  - Pain that is real, but not useful
  - Avoidance generally not beneficial
- Etiology
  - Often unknown and multifactorial
  - Symptoms are the disease
- Treatment course
  - Management focused
  - Long-term
  - Multidisciplinary/transdisciplinary focus

Nociception



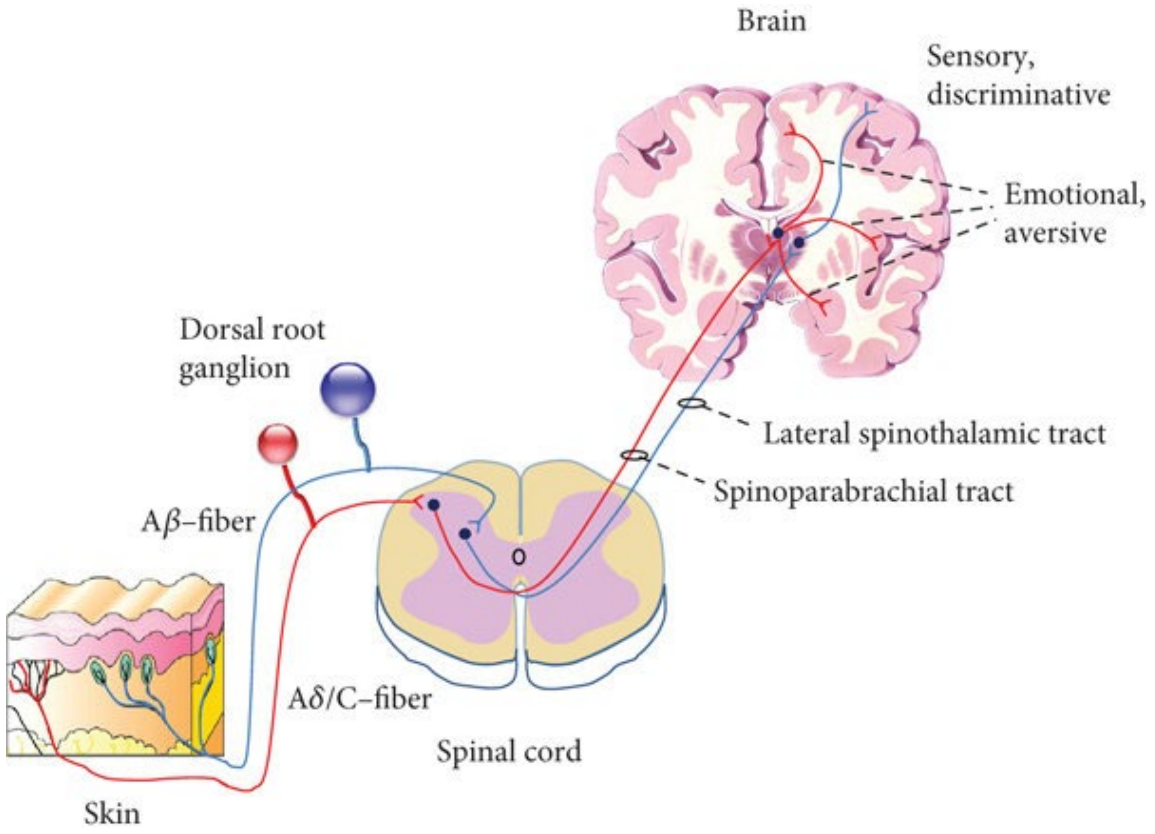
- **Nociception** (/ˌnəʊsɪˈsɛpʃ(ə)n/); from Latin *nocēre* 'to harm/hurt') is the sensory nervous system's process of encoding noxious stimuli.
- First used in 1906 by Charles Scott Sherrington, a British neurophysiologist, in *The Integrative Action of the Nervous System*

Nociception and pain

Cortico-limbic striatal circuits
- Attention/interpretation/behavioral response
- Sympathetic response

Spinothalamic transmission
- Dorsal horn of the spine
- Descending modulation

Nociceptor stimulation
- Tissue damage
- Tissue tolerance threshold



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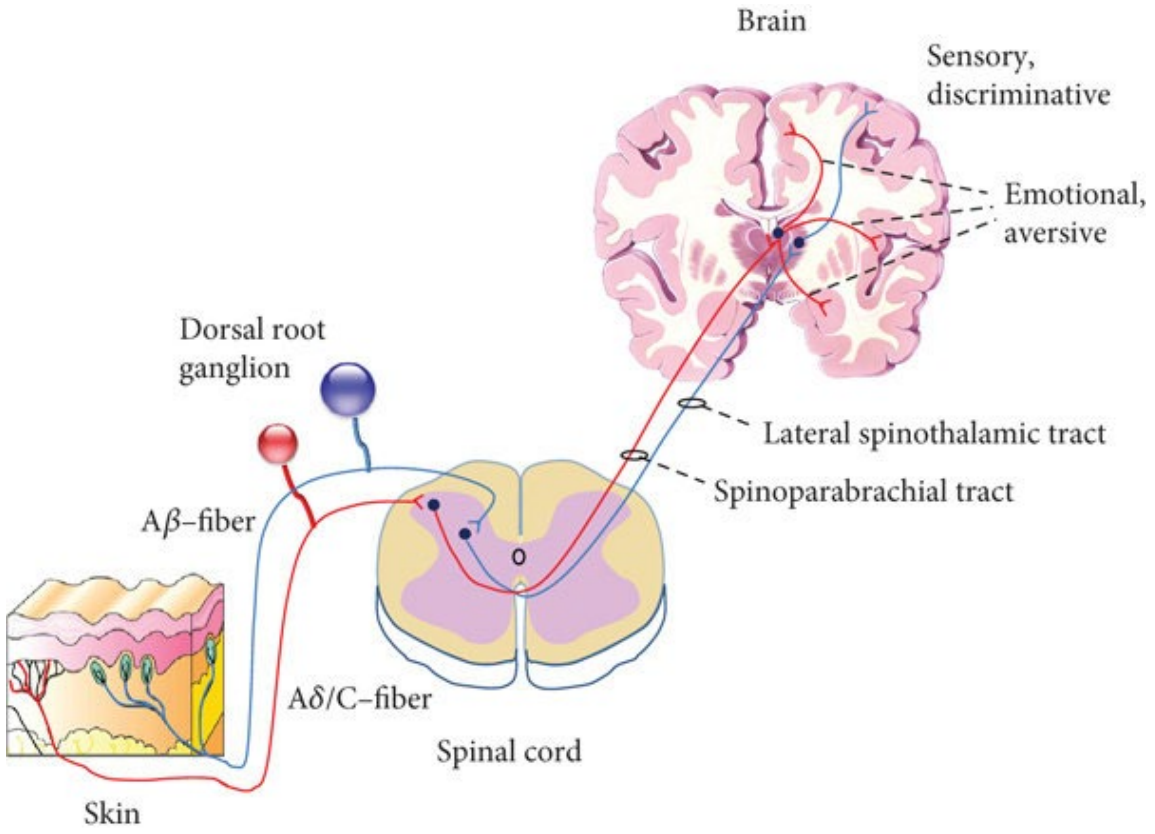
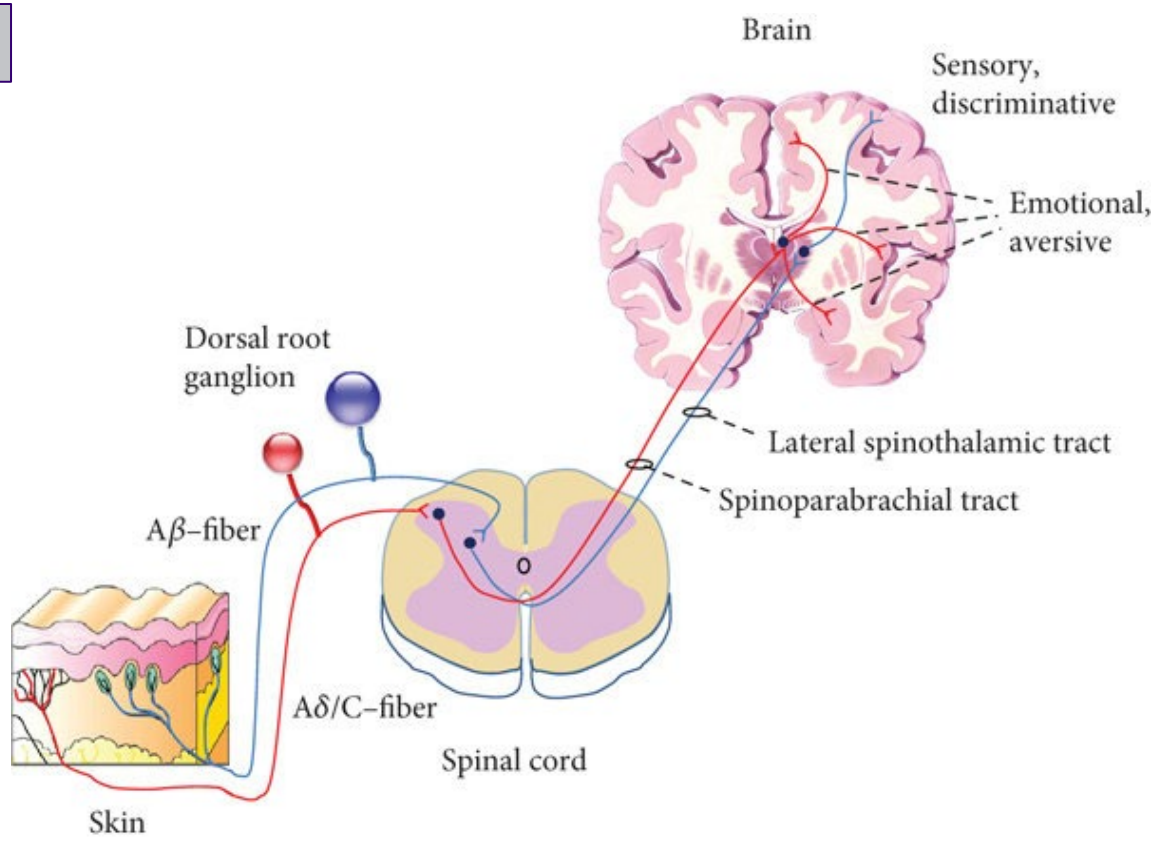


Nociception and pain

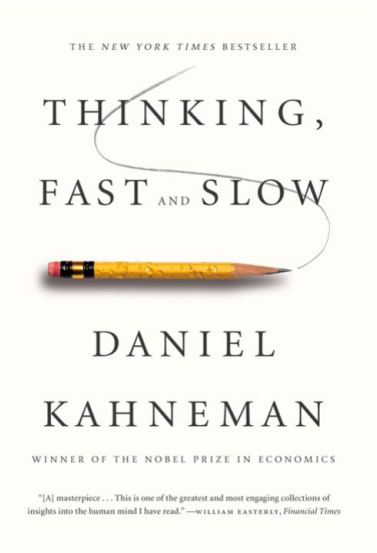
Cortico-limbic striatal circuits — Inflammation
- Attention/interpretation/behavioral response
- Sympathetic response

Spinothalamic transmission — Inflammation
- Dorsal horn of the spine
- Descending modulation

Nociceptor stimulation — Inflammation
- Tissue damage
- Tissue tolerance threshold



Dual-process thinking



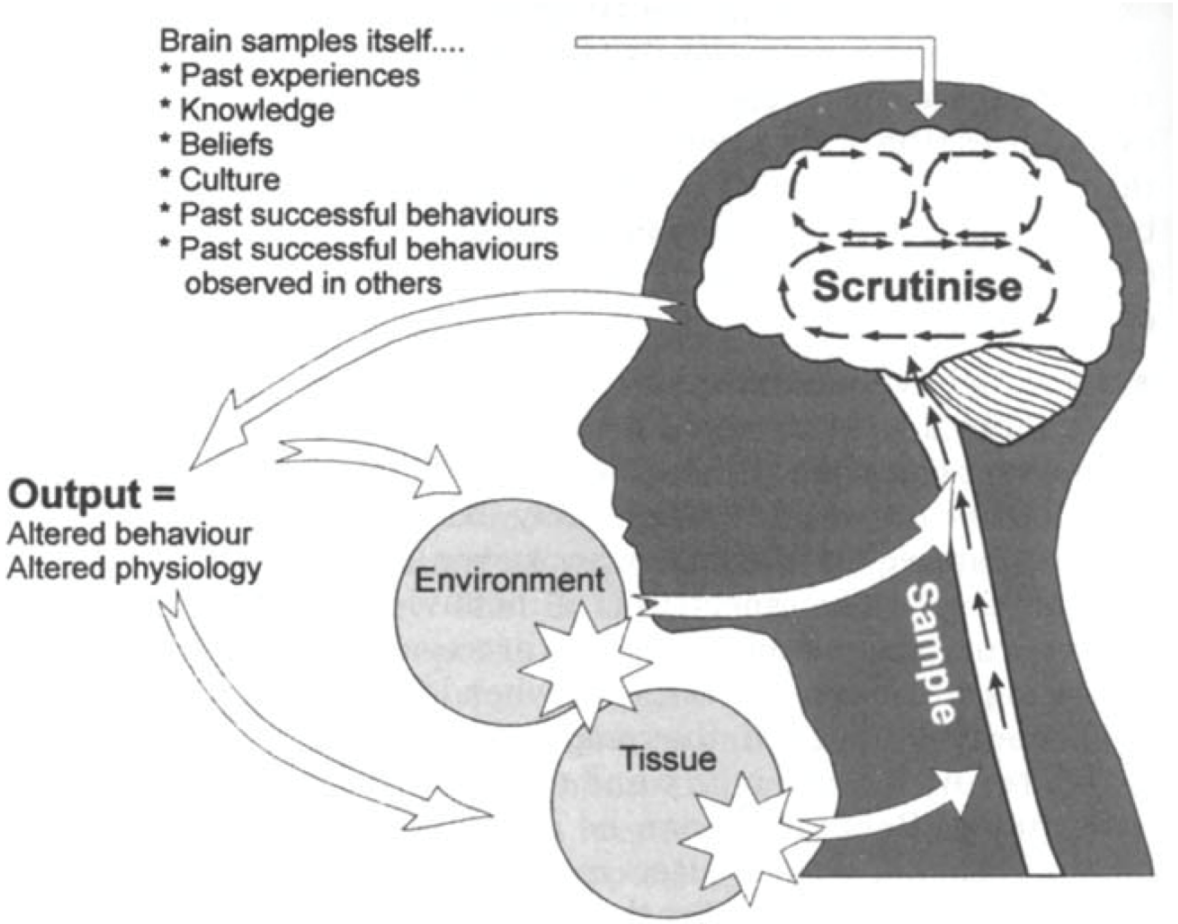
- Thinking, fast and slow

- System 1 (Fast Thinking):
  - Intuitive, automatic, and quick.
  - Relies on heuristics, biases, and immediate perceptions.
  - Acts without conscious effort.
  - Efficient but prone to errors.

- System 2 (Slow Thinking):
  - Deliberative, analytical, and effortful.
  - Involves conscious attention, reasoning, and evidence gathering.
  - Slower but more accurate.
  - Used for complex tasks and decision-making.

(Kahneman, 2011)

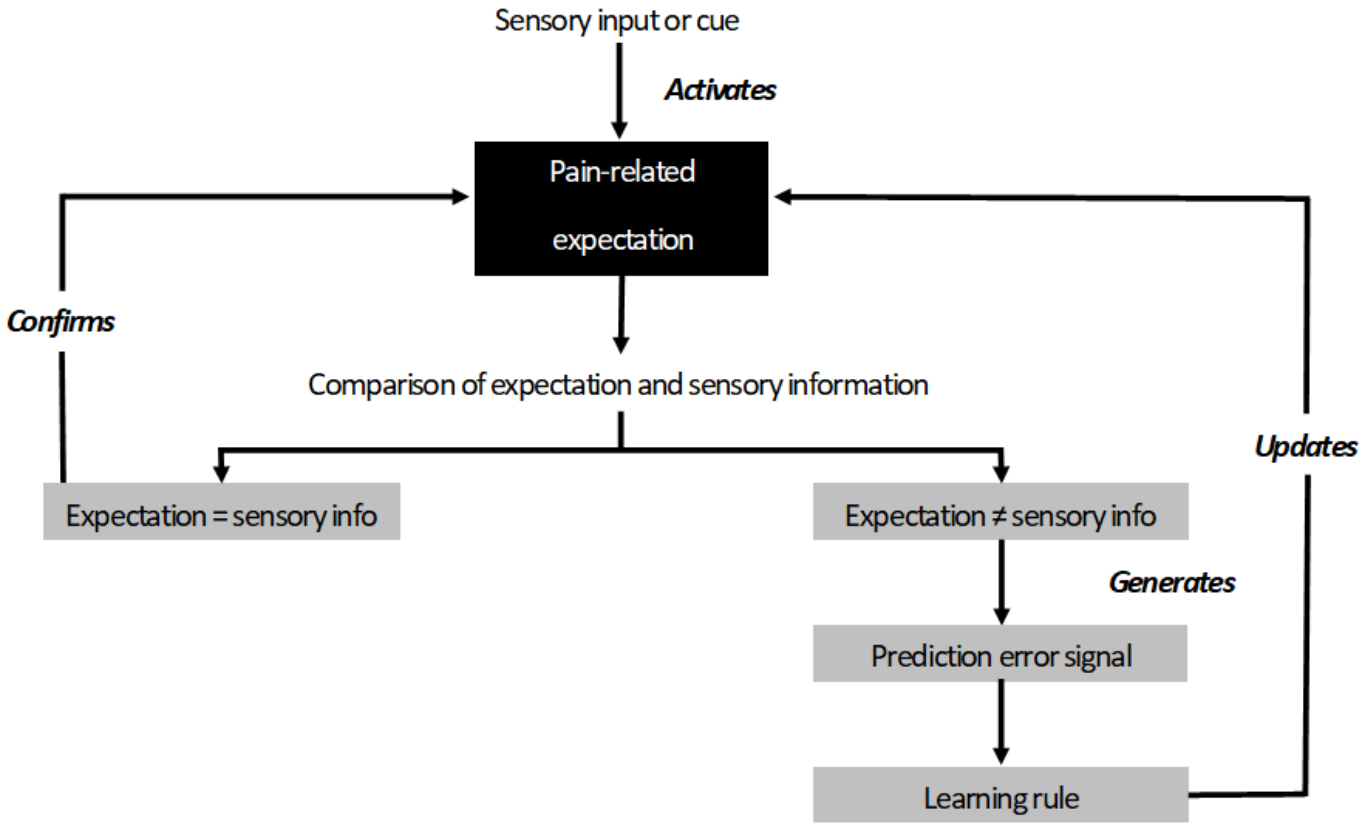
The Mature Organism Model



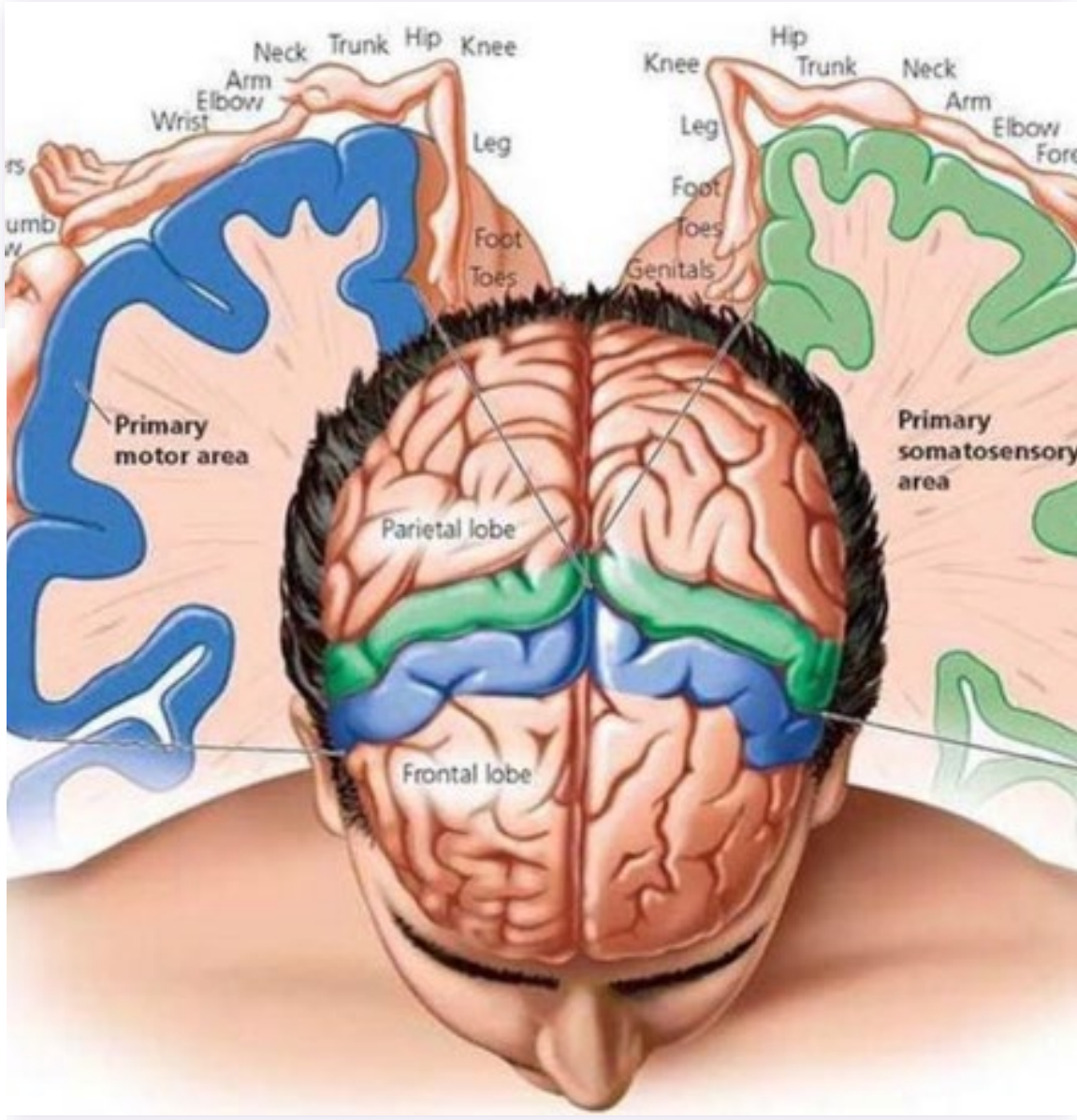
Outputs include altering behaviors, changes in physiology, changes in mood and emotions, changes in beliefs and understanding, and changes in in pain perception.

(Gifford, 1998; Gifford, 2013; Bennett et al. 1998)

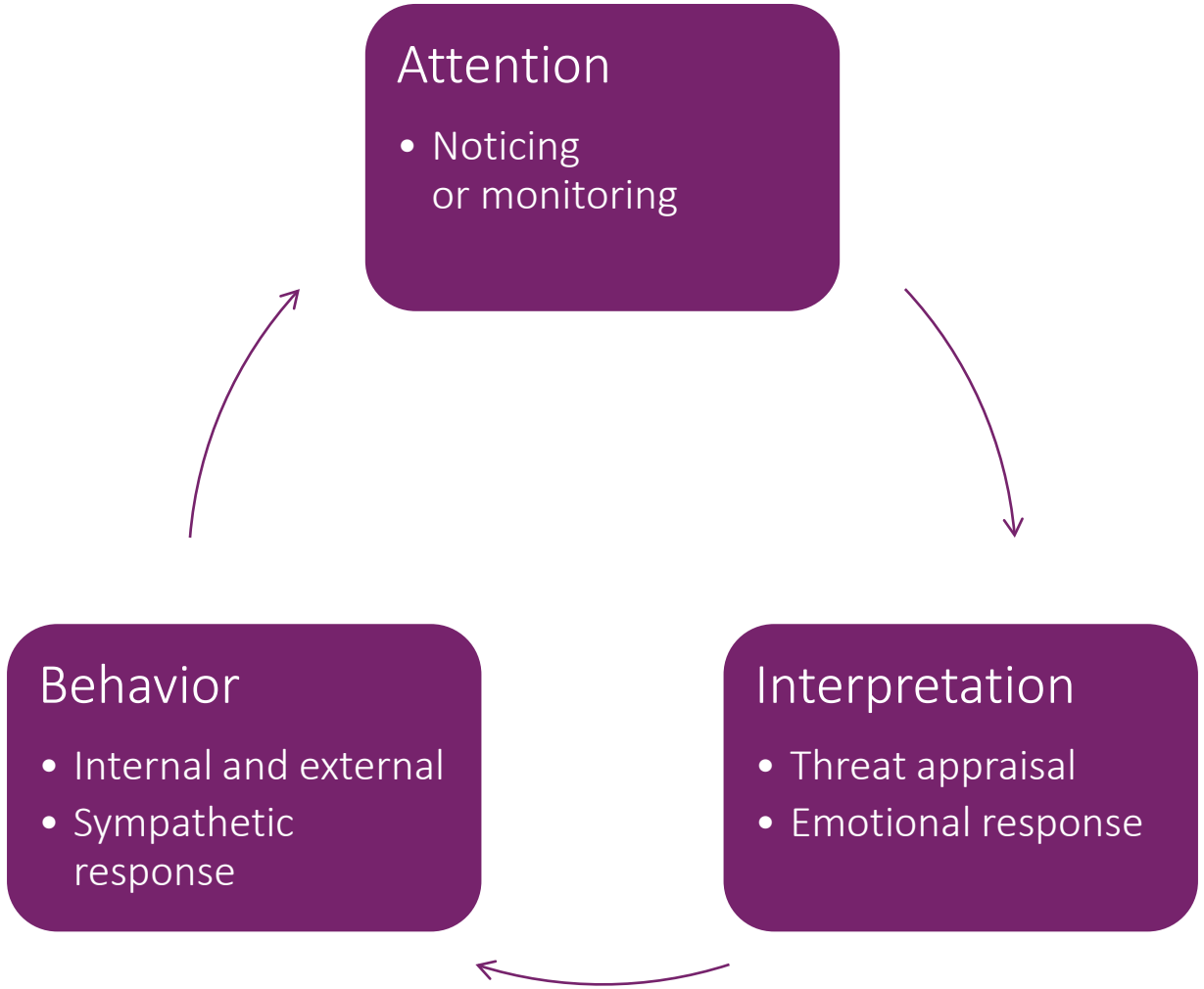
The Predictive Processing Model



(Wiesh, 2016)

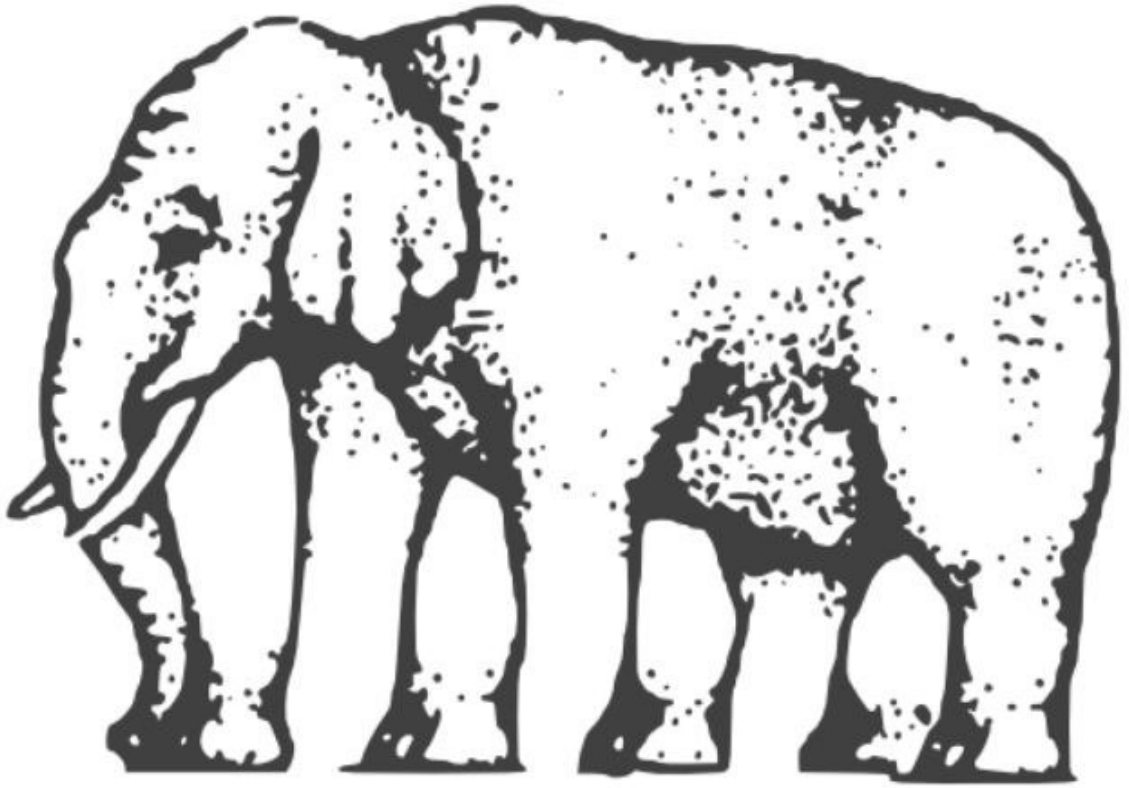


Threat appraisal, conditioning, & extinction learning



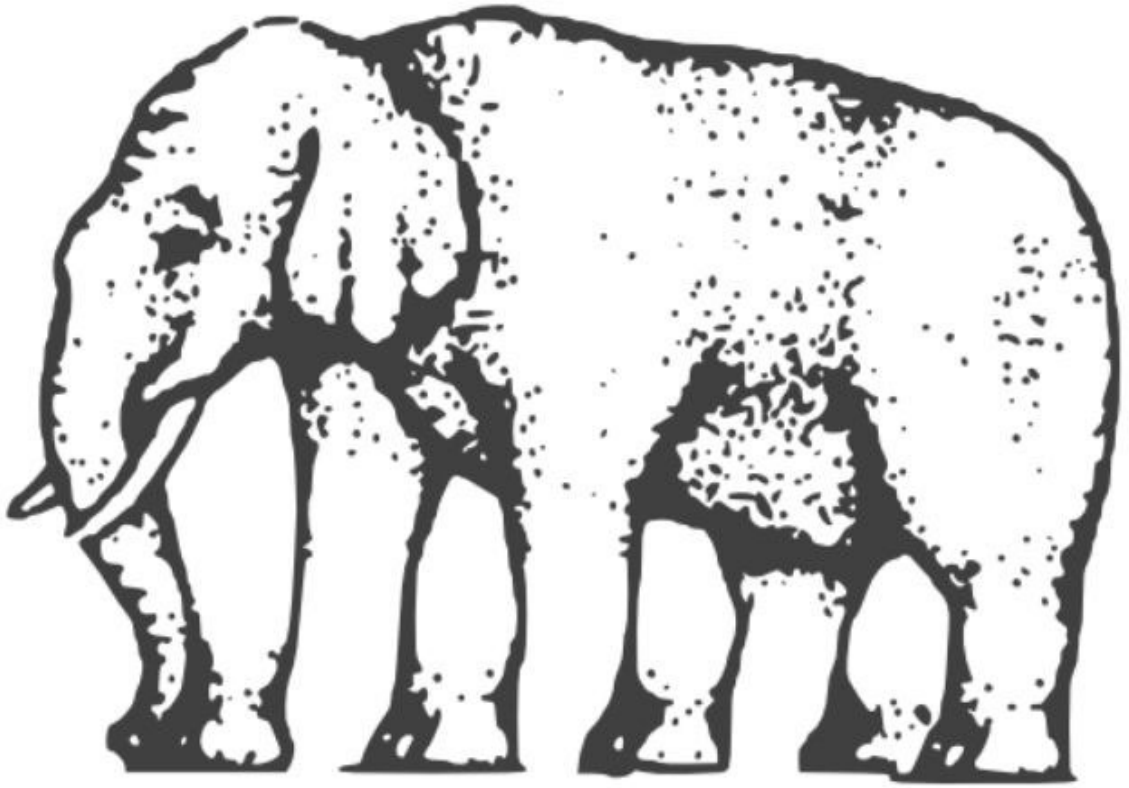
Nociception and perception

- What is this?



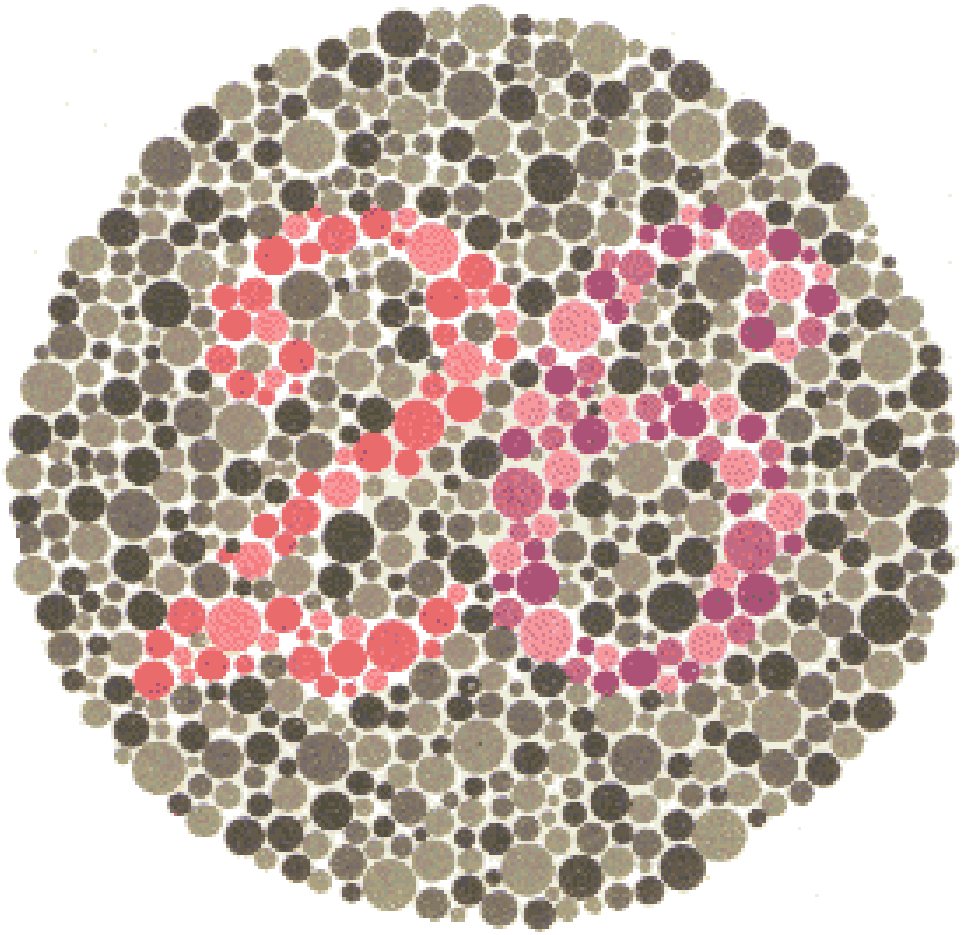
Nociception, perception, and interpretation

- How many legs does the elephant have?



Perception vs. Facts

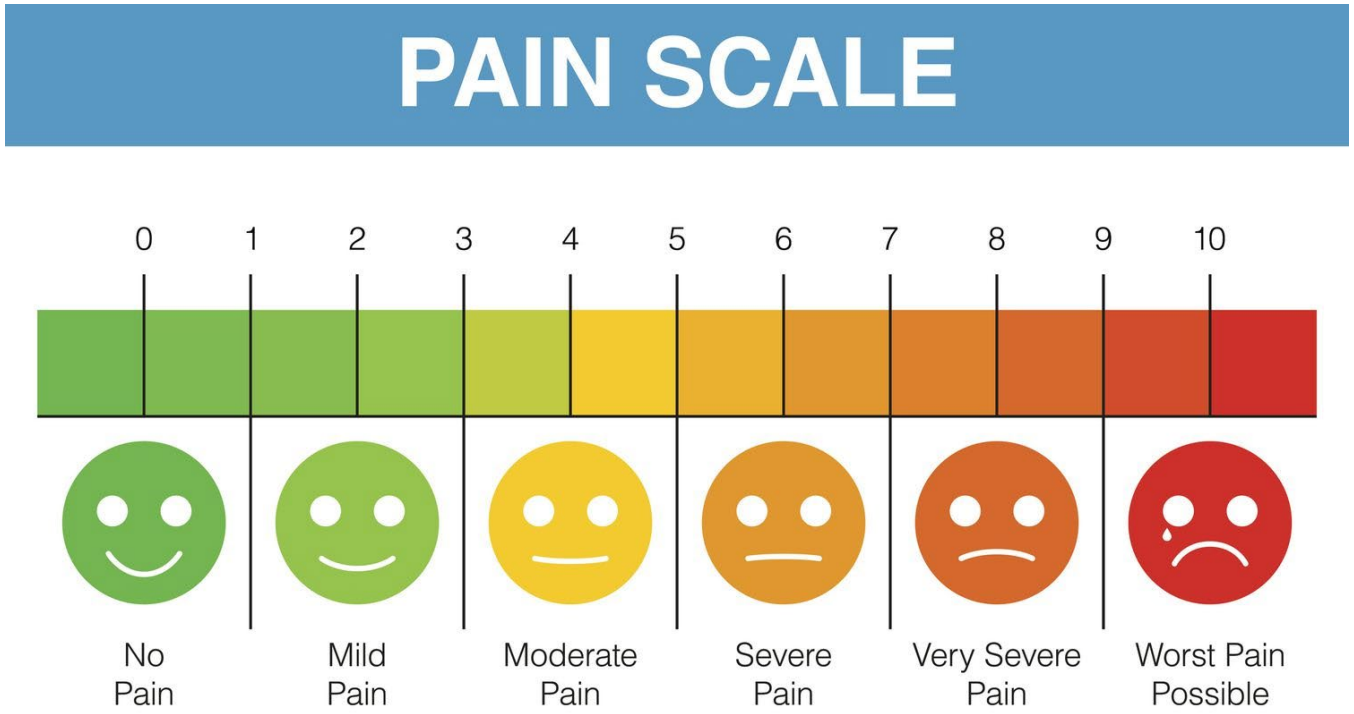
- What number do you see in the circle?
  - 26
  - 2
  - 6
  - I don't see a number



Ishihara Color Blindness Test Plate 16

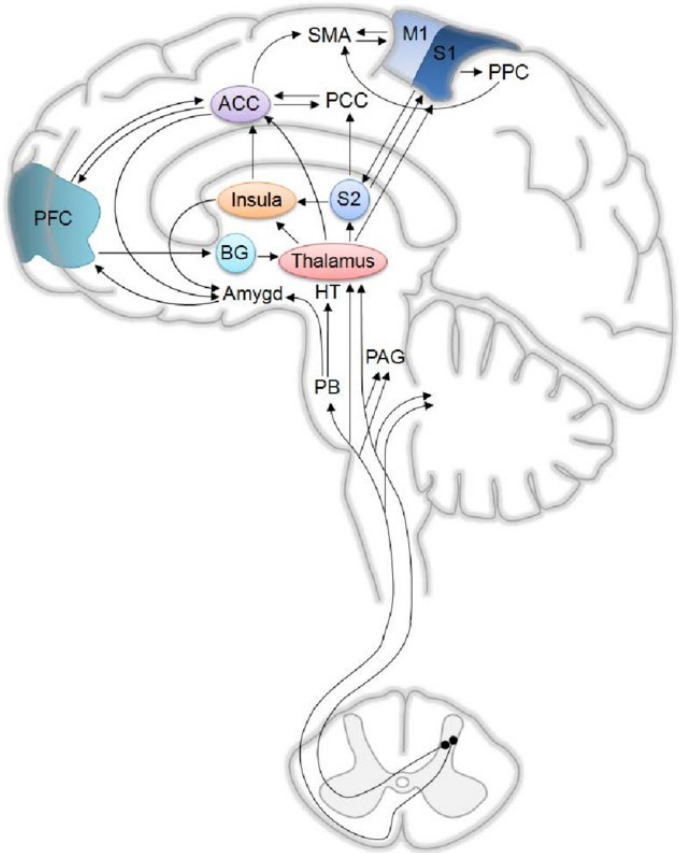
Pain is subjective, modifiable, and multifactorial

- Pain is whatever a person says it is...



Relating neuroscience of pain to patient experience

Prefrontal cortex
Medial prefrontal cortex
Right lateral orbitofrontal cortex
Nucleus accumbens
Anterior cingulate cortex
Somatosensory cortex
Insular cortex
Periaqueductal gray
Thalamus
Amygdala

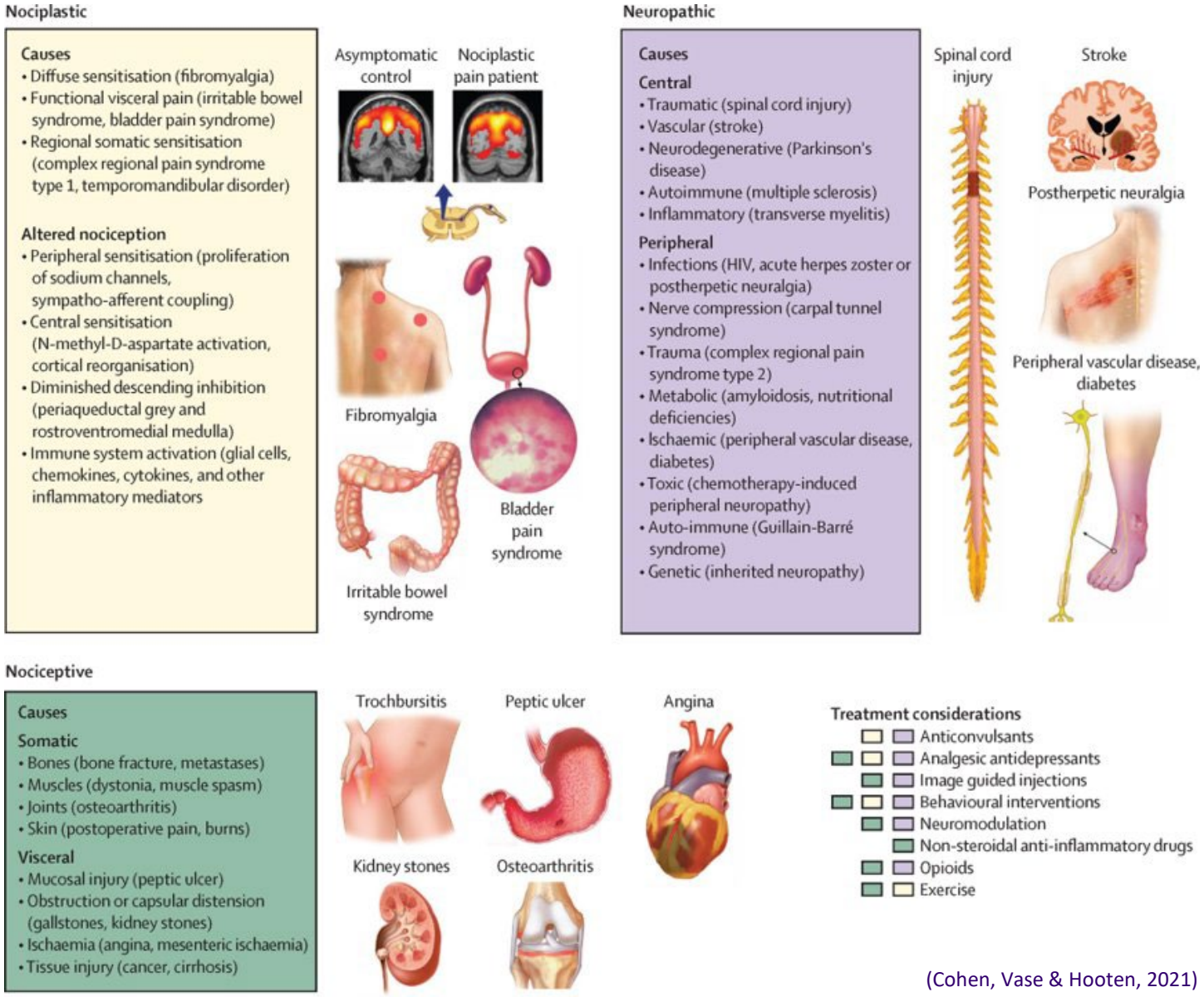


<u>Areas of the brain responsible for</u>:

- Attention
- Focus
- Self-regulation
- Reasoning
- Planning
- Threat appraisal and response
- Learning/memory
- Reward/aversion
- Motivation
- Internal body map/body awareness
- Distress associated with pain
- Integration of sensory awareness with emotion and consciousness
- Endogenous opioid system

Different types of pain

- Nociceptive
  - Associated with activation of nociceptors (inflammation, mechanical/irritant, injury)
  - Examples: acute injury, arthritis



(Cohen, Vase & Hooten, 2021)

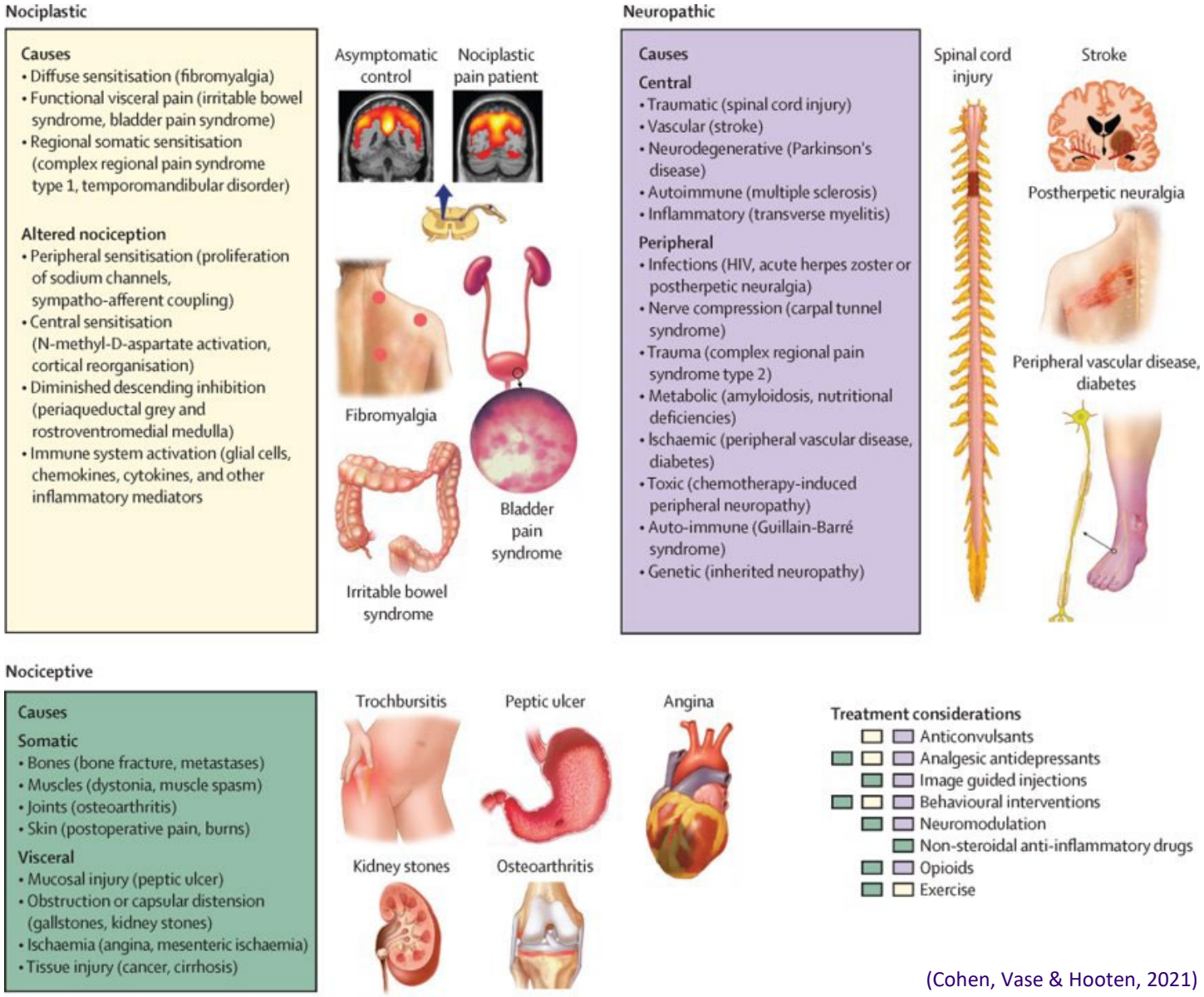
Nociceptive Pain Metaphor

An indicator the protect with pain threshold has been met, or that there is ongoing tissue damage

Actively burning yourself on a fire or the stove. This pain is a protective alarm and functional. It is our brain telling our body to adapt, so we don't risk damage or sustain additional damage to our tissues.

Different types of pain

- Neuropathic
  - Due to lesion, disease, inflammation of the somatosensory system
  - Diabetic neuropathy, carpal tunnel, complex regional pain syndrome



(Cohen, Vase & Hooten, 2021)

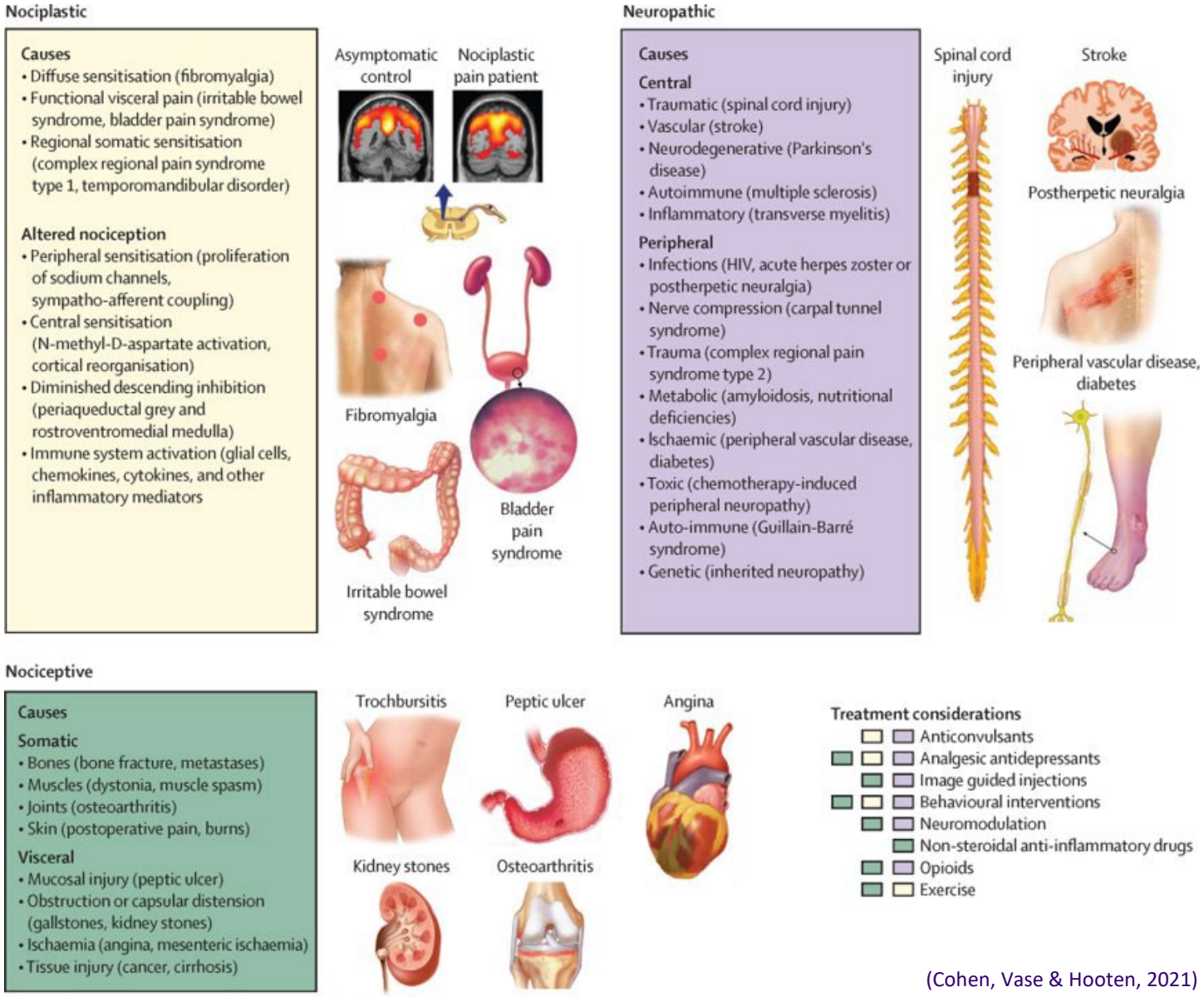
Neuropathic Pain Metaphor

Remember: Indicator of historical damage, not emergent ongoing tissue damage

A reminder there was a change in the system, like damage to your peripheral nerves in diabetic neuropathy. This functions like a smoke detector. Smoke detectors can detect smoke from fires, but they can also go off because you are burning popcorn or need to replace the battery. The smoke alarm doesn't mean there is a fire, but a change in the system indicates risk.

Different types of pain

- Nociplastic/primary pain
  - Due to change in central processing of pain/pain-related stimuli
  - Examples: fibromyalgia, temporomandibular disorders, non-specific low back pain



(Cohen, Vase & Hooten, 2021)

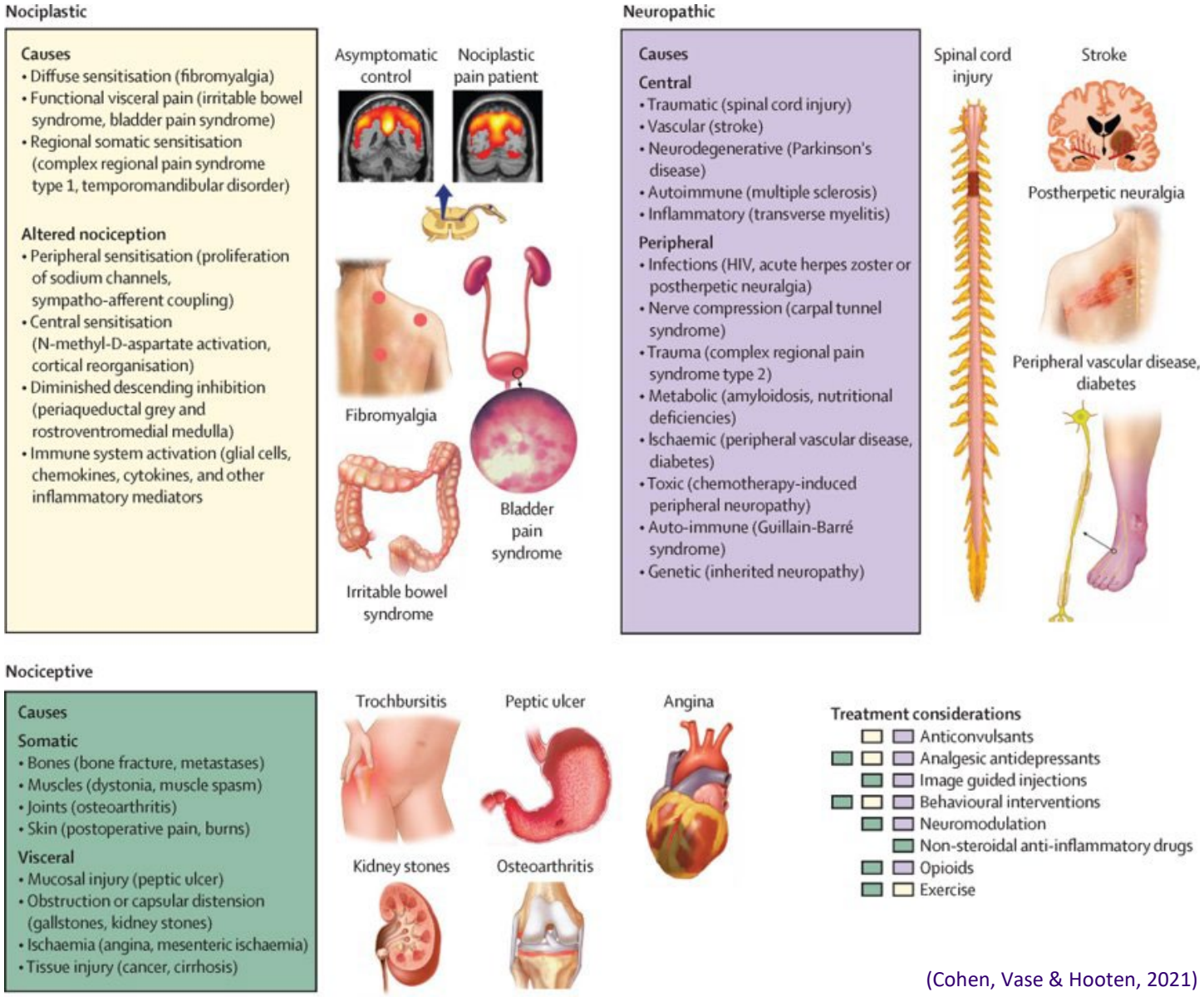
Nociplastic Pain Metaphor

Remember: Pain system hypersensitivity

- Just like wildfire risk and restrictions, nociplastic pain is a prediction of potential tissue damage due to neuroplastic changes in the central nervous system. It is turning up the sensitivity of the nervous system and telling your body about potential perceived risks due to altered nociception despite no clear evidence of damage.

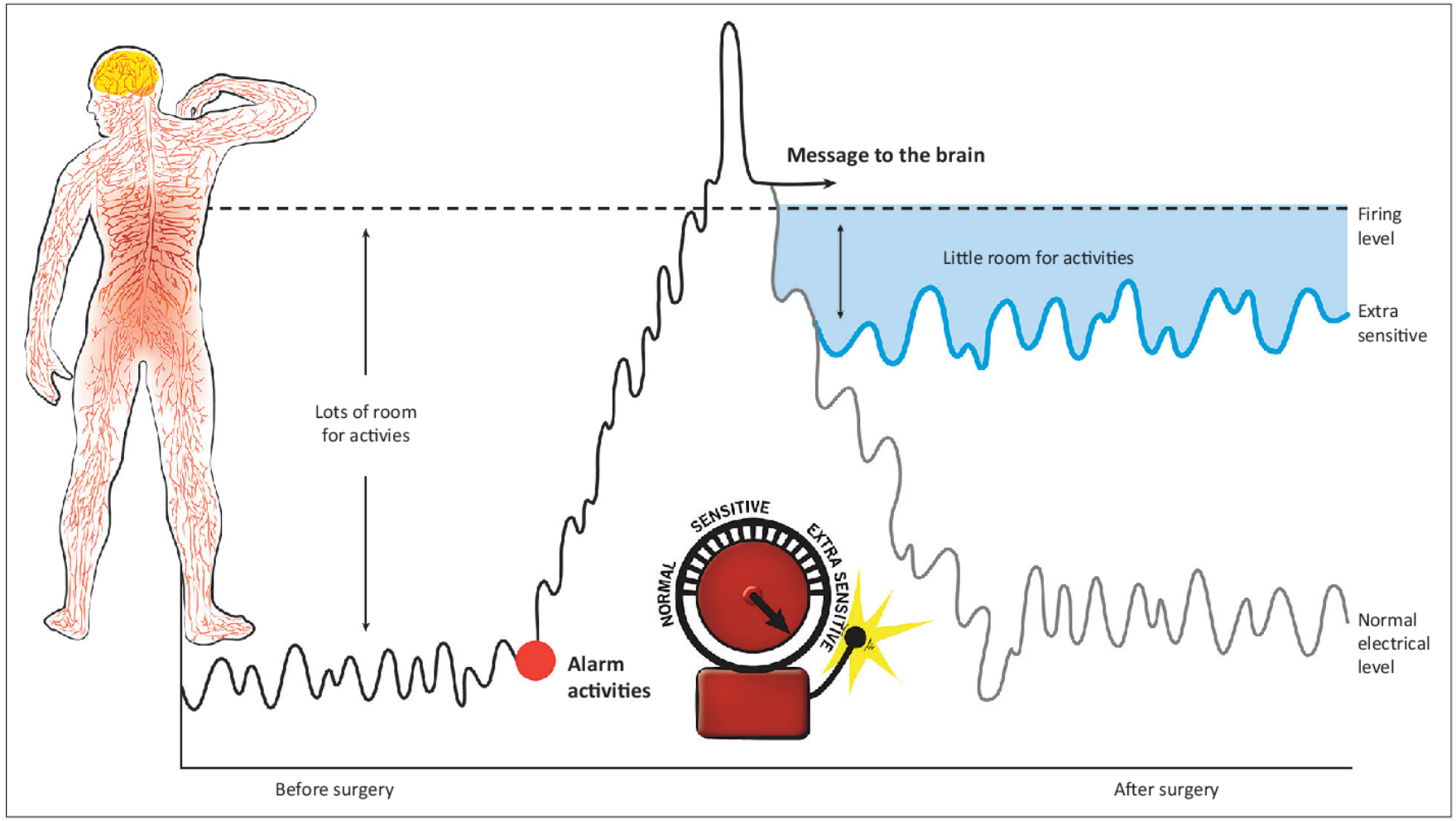
Different types of pain

Typically, people have a combination of pain types/underlying mechanisms.



(Cohen, Vase & Hooten, 2021)

Sensitization: protect by pain threshold



Source: Louw, A., 2012, *Your nerves are having back surgery*, OPTP, Minneapolis, MN

FIGURE 1: Example of picture to explain 'extra-sensitive alarm'.

Making sense of protective pain

- Examples are helpful!
- Getting too cold, holding something too hot
- Pain and fatigue with regular exercise and activity
- Allodynia and adjacent sensitization
- Referred pain
- Contralateral sensitization
- Learned navigational responses

Making sense of protective pain

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- Getting too cold, holding something too hot
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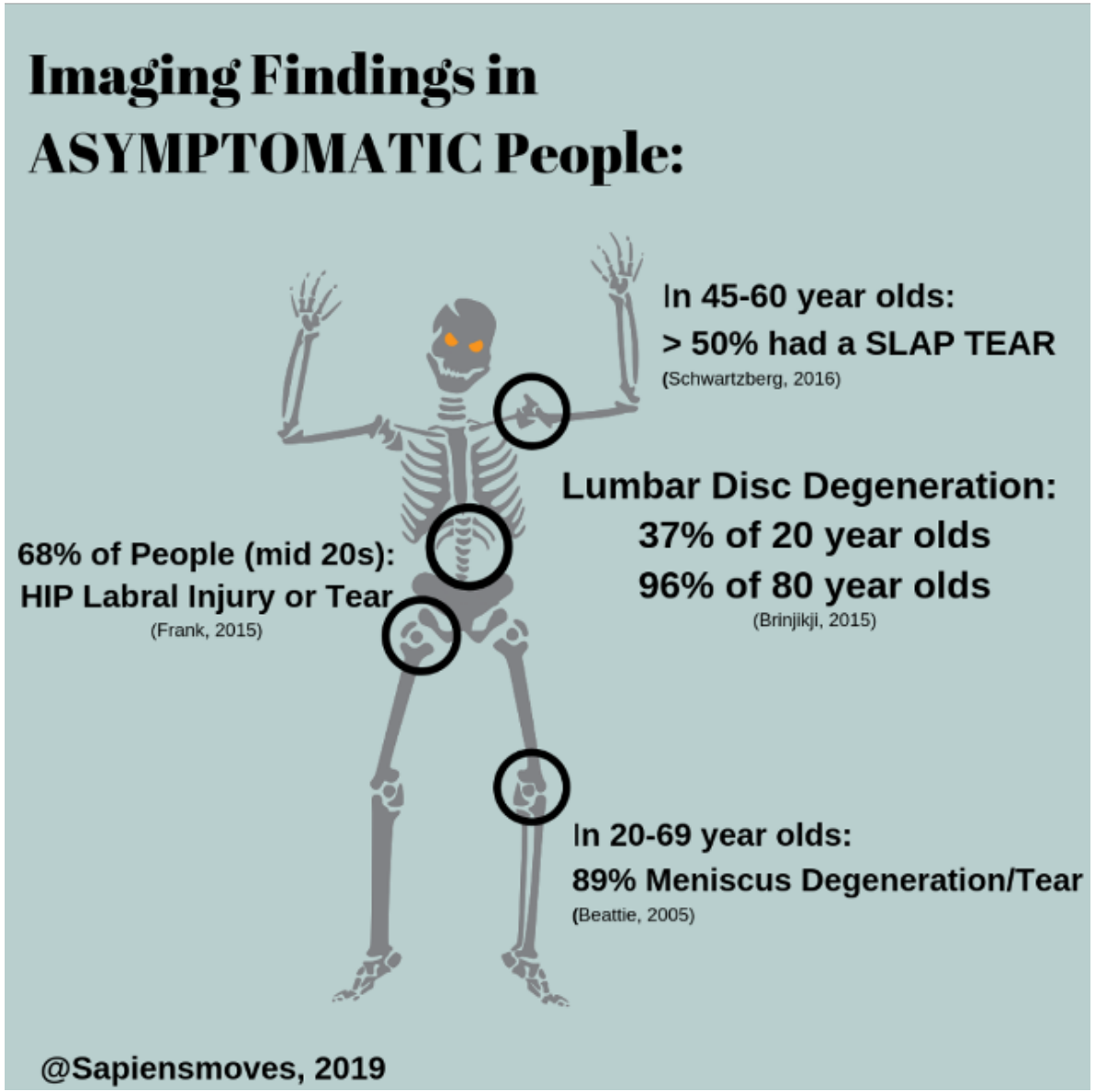
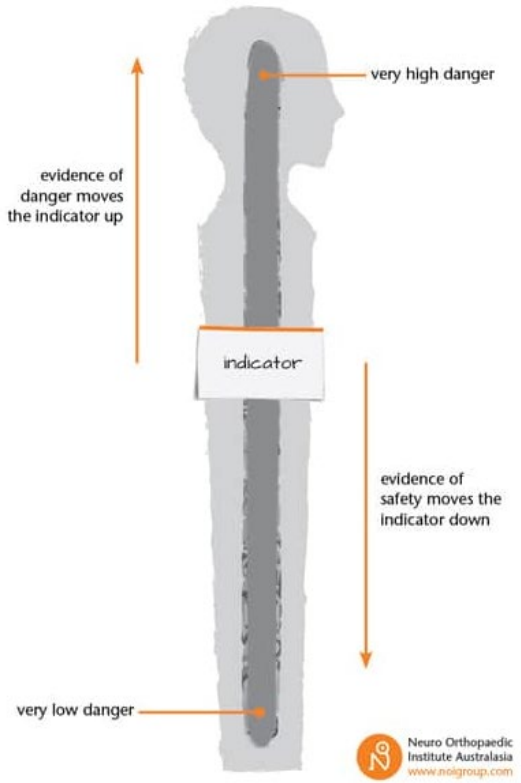
What about injury and imaging?



Safety in Me (SIMs) vs. Danger in Me (DIMs)

- DIMs and SIMs triggers can be provoked by a variety of stimuli, including:
  - Things you do
  - Things you say
  - People in your life
  - Places you visit
  - Things you think and believe about your pain
  - Things you hear, taste, see, touch and smell
  - Things happening in your body



(Moseley & Butler, 2015)

Factors associated with pain perception

Increase pain awareness

Physical/behavioral

- Body position (e.g., prolonged sitting)
- Overdoing/underdoing activity
- Muscle tension/stress response
- Sleep disturbance

Cognitive/Emotional

- Attention to pain
- Distress associated with pain
- Depressive/anxiety symptoms
- Difficult emotions
- Trauma exposure

Social/Environmental

- Isolation
- Too much/too little support
- Work environment

Decrease pain awareness

Physical/behavioral

- Medication
- Counter stimulation
- Paced appropriate activity level
- Exercise
- relaxation

Cognitive/Emotional

- Understanding pain neuroscience
- Self-efficacy beliefs
- Engagement in pleasant and meaningful activities
- distraction
- Positive mood state
- Mental relaxation

Social/Environmental

- Positive social engagement
- Empowering social support

How to start PNE

- We want to first meet needs, before jumping into instruction

- Understand how the patient conceptualizes their pain experience
  - What do they think is going on in their body?
  - What worries them about their pain/symptoms?
- Elicit goals
  - Treatment, activity, experiential
- How is pain impacting their life?
  - bio/psycho/social/spiritual

Stanford 5 questions for pain assessment:

- **Cause**: What does the patient believe is causing their pain?
- **Meaning**: Does the patient hold any sinister beliefs about the cause, diagnosis, or potential for injury/degeneration.
- **Goals**: What is the patient hoping to get out of treatment? What are they hoping will change? Elicit both treatment and activity goals.
- **Treatment**: What the patient believes needs to be done now and in the future to help resolve the problem.
- **Impact**: What impact does the primary problem have on the patient's life including interference on vocational, social, recreational activities, and quality of life.

A Tale of Long COVID

- Late 20's Caucasian male with no prior pain history - longstanding/untreated depression and anxiety
- Acute COVID reaction in 2021
  - All joints were "on fire" with fever, headache, nausea - symptoms resolved <24 hours
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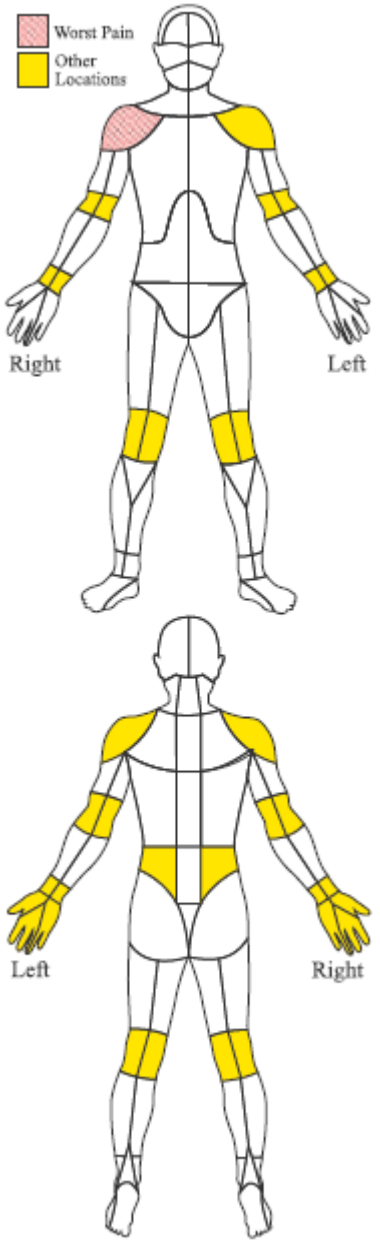

Goals for breakout

- Roleplay talking to the patient about:
  - There are many potential contributors to anyone's pain
  - We are all bioplastic
  - Pain is not an accurate marker of tissue state
  - Pain education is treatment
  - Pain is a brain output
  - Pain is a protector
  - Pain can become overprotective/sensitized.

Breakout and practice

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Discussion & questions

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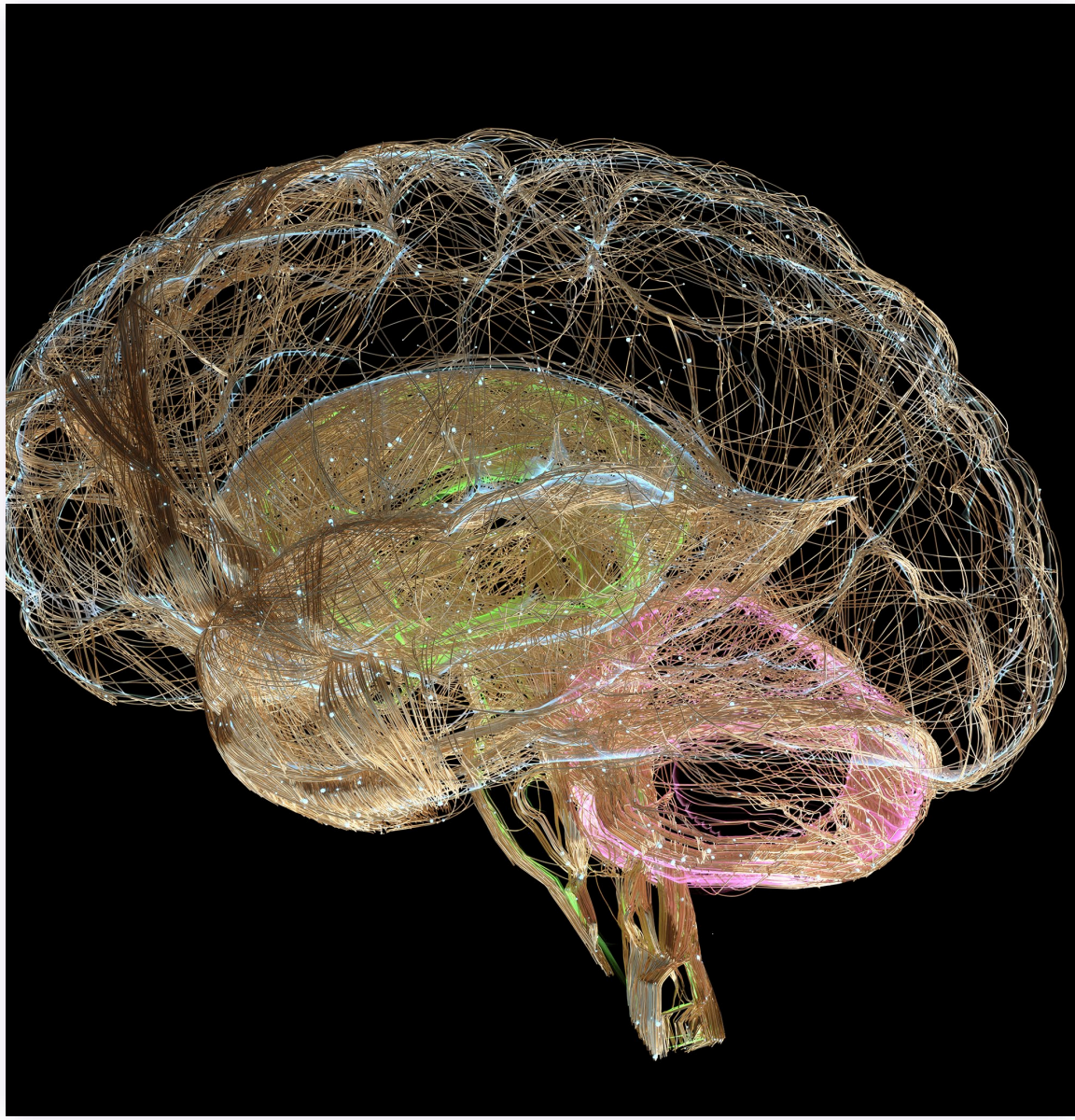
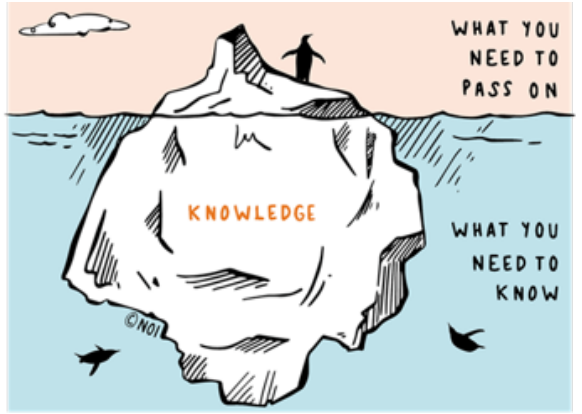
Pain psychology interventions

- Reduce impact of pain on well-being and improve function.

- Desensitization and graded exposure (attention/interpretation)
- Understanding pain neuroscience (interpretation)
- Decoupling pain from distress (interpretation/behavior)
- Self-soothing and distress tolerance (interpretation/behavior)
- Emotion and trauma processing (attention/interpretation/behavior)
- Engagement with meaningful activities (attention/interpretation/behavior)



Poll



After this session, how comfortable are you talking to your patients about pain and providing pain neuroscience education in the future?

TelePain

UW Medicine

TelePain and Opioid/Pain Hotline

UW TelePain

A service for community-practice providers to increase knowledge and skills in chronic pain management

UW TelePain sessions are collegial, audio/video-based conferences that include:

1. **Didactic presentations** from the UW Pain Medicine curriculum for primary care providers.
2. Case presentations from community clinicians.
3. Interactive consultations for providers with a multi-disciplinary panel of specialists.
4. Education in use of guideline-recommended measurement-based clinical tools to improve diagnosis and treatment effectiveness.
5. Follow-up case presentations to track outcomes and optimize treatments for ongoing care of your patients.

UW TelePain sessions for community health care providers are held each Wednesday, noon to 1:30 p.m.

You are invited to present your difficult chronic pain cases or ask questions, even if you don't present a case.

The expertise of the UW TelePain Panel spans pain medicine, internal medicine, anesthesiology, rehabilitation medicine, psychiatry, addiction medicine, and nursing care coordination.

Learn more about these sessions on the UW TelePain website
http://depts.washington.edu/anesth/care/pain/telepain/

Questions?
telepain@uw.edu

To register:
Download and complete the registration form and fax it to 206-221-8259. Form location
http://depts.washington.edu/anesth/care/pain/telepain/TelePain-Participant-Reg-Form.pdf

UW Medicine PAIN MEDICINE

Washington State Health Care Authority

Are CME credits available? Yes.
The University of Washington School of Medicine is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

The University of Washington School of Medicine designates this live activity for a maximum of *73.5 AMA PRA Category 1 Credits™*. Physicians should claim only the credit commensurate with the extent of their participation in the activity. (Each session 1.5 credits)

Clinicians: caring for patients with complex pain medication regimens? We're behind you.

UW Medicine
Pain and Opioid Consult Hotline for Clinicians
1-844-520-PAIN (7246)

UW Medicine pain pharmacists and physicians are available Monday through Friday, 8:30 a.m. to 4:30 p.m. (excluding holidays) to provide clinical advice at no charge to you.

Consultations for clinicians treating patients with complex pain medication regimens, particularly high dose opioids:

- Interpret Washington State Prescription Monitoring Program record to guide you on dosing
- Individualized opioid taper plans
- Systematic management of withdrawal syndrome
- Evaluate/recommend non-opioid/adjuvant analgesic treatment
- Triage and risk screening
- Individualized case consultation for client care and medication management
- Explain/review Center for Disease Control and Prevention (CDC) opioid guidelines: **https://www.cdc.gov/mmwr/volumes/65/rr/rr6501e1.htm**
- Will help identify and refer to other resources:
  - Evaluation of Substance Use Disorder, Washington Recovery Help Line 1-866-789-1511
  - Local pain clinics for patient referrals: **www.doh.wa.gov/Emergencies/PainClinicClosures/PainClinicAvailability**
  - UW TelePain Services: Available Wednesdays noon to 1:30 p.m. **http://depts.washington.edu/anesth/care/pain/telepain**

UW Medicine PAIN MEDICINE

Washington State Health Care Authority

Additional Resources

UW Medicine

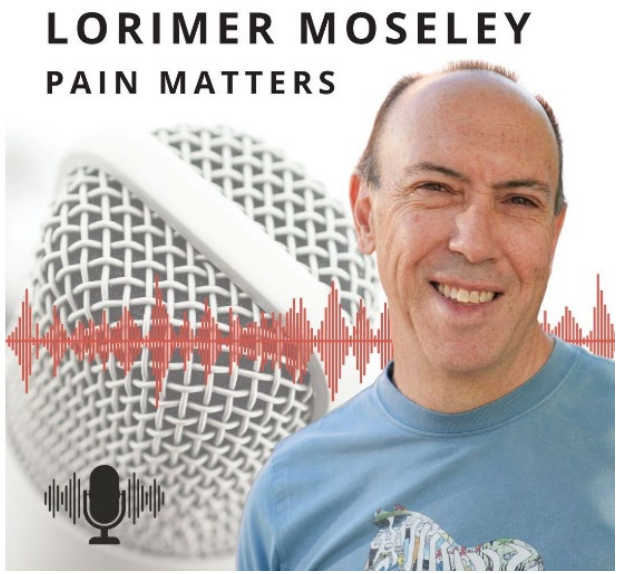
Additional PNE training

- Multiple publications (USA distributor):
  - Explain Pain
  - Explain Pain Supercharged
  - Painful Yarns
  - Pain and Perception: A Closer Look At Why We Hurt
- Online Learning:
  - Explain Pain On-Demand (Explain Pain On-Demand - Noigroup)
- Live Presentations (Noigroup USA - Noigroup)

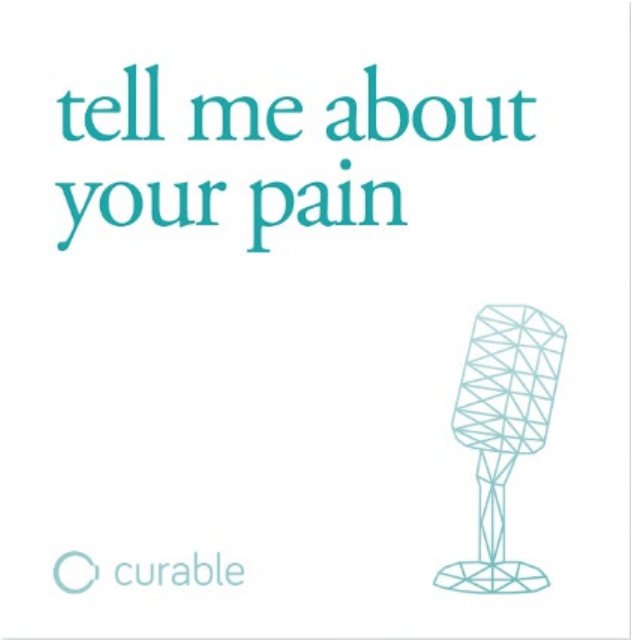
Additional PNE training

- EIM | Evidence In Motion
- Multiple online learning options on PNE
  - Continuing Education • EIM | Evidence In Motion CEUs

Podcasts


LORIMER MOSELEY
PAIN MATTERS

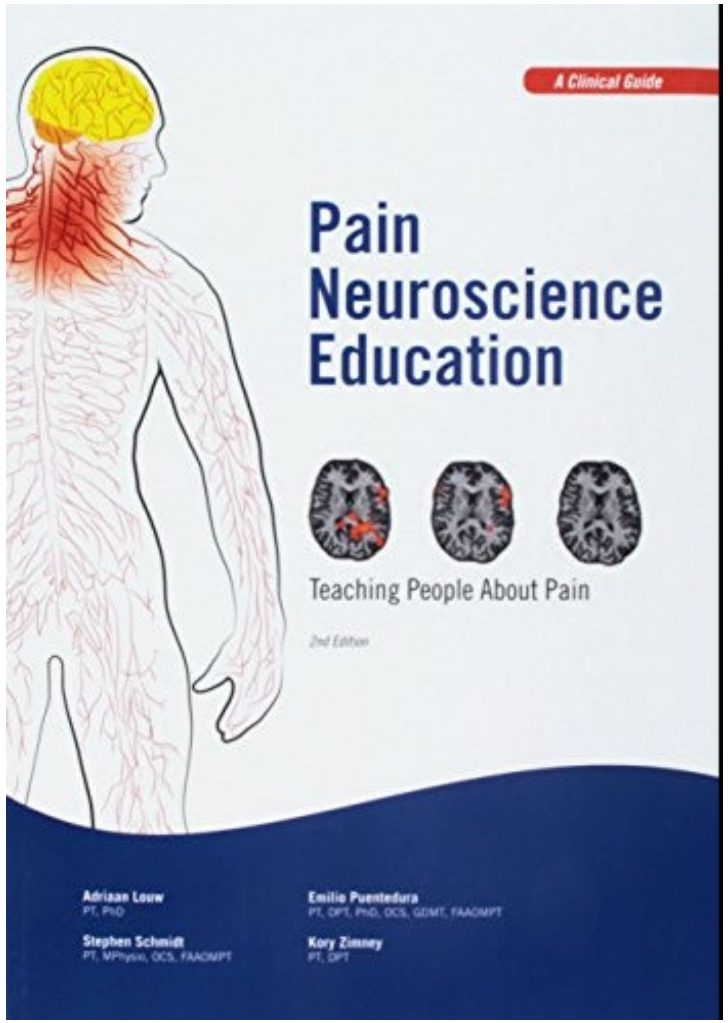

Like Mind
Like Body
curable


tell me about
your pain
curable

Websites

- Pain Neuroscience Education (PNE) - Physiopedia (physio-pedia.com)
- Why You Hurt | Adriaan Louw
- Understanding Pain - Flippin' Pain (flippinpain.co.uk)

Textbook



Pain Neuroscience Education

- Adriaan Louw
- Stephen Schmidt
- Emilio Puentedura
- Kory Zimney

Thanks

UW Medicine