Pain measurement and registration in non-verbal patients

Morten Høgh

***MSc Pain**: Science & Society*
***Specialist Physical Therapist** in Musculoskeletal Physiotherapy (COMT), S**pecialist Physical Therapist** in Sports Physiotherapy (RISPT)*

*Affiliations: **Center for Neuroplasticity and Pain** (CNAP) Aalborg University - www.videnomsmerter.dk - FysioDanmark Aarhus/Fysiocenter*

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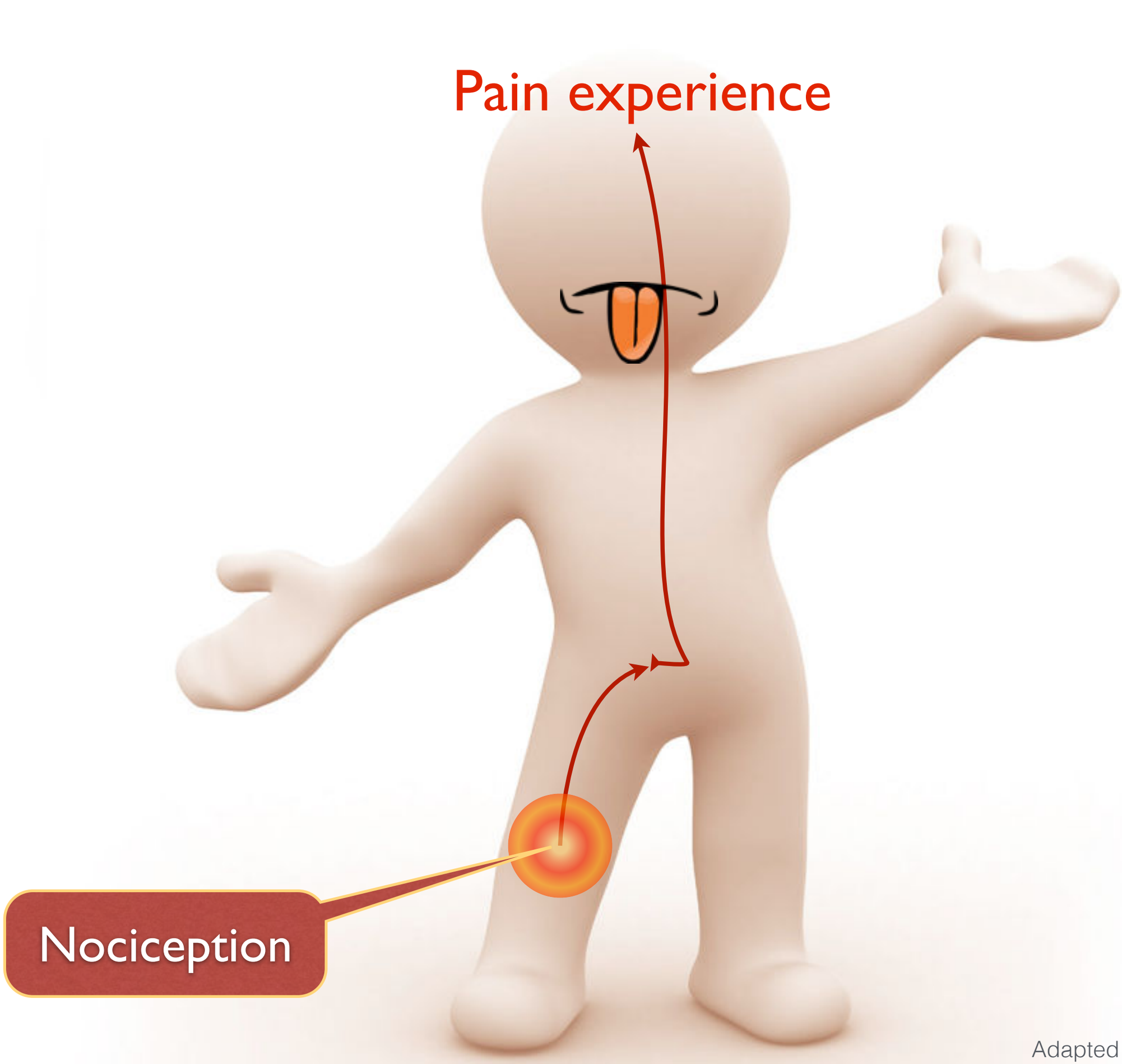
“If **color was a sense**, then **red is pain**.
But how would you determine
the color and the nuances if
not by **asking** the **patient**”.

The Biopsychosocial Model

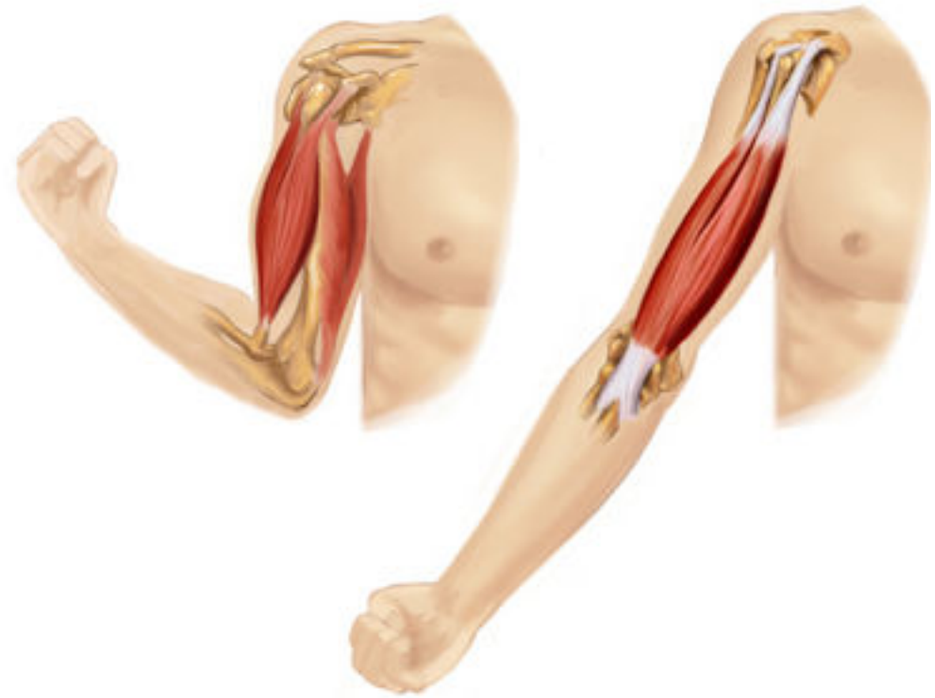
- Biochemical reactions do not translate directly into an **illness**
- Biological derangements do not shed light on the **meaning** of the symptoms in the patient
- Finding biology and treating patients require different **skill sets**
- Adopting a **sick role** does not require any biological derangement
- The success of biological treatments are **influenced** by
  - Psychosocial factors (including placebo/nocebo)
  - Adherence to treatment (therapeutic alliance)
  - Patients are influenced by their clinicians - and visaversa

Engel (1977/1980) Borrell-Carrio et al. (2004)

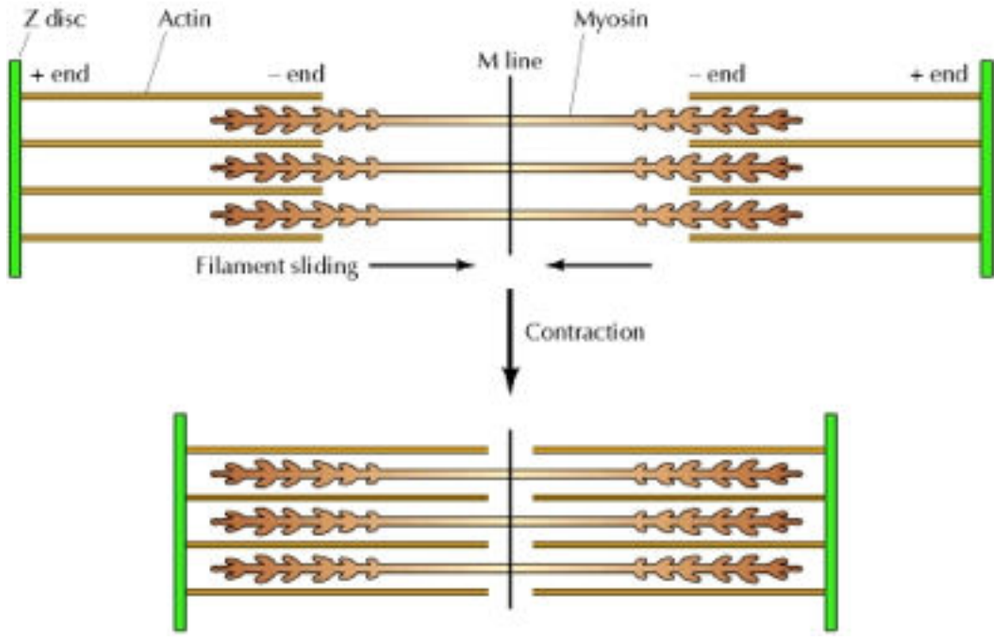


Adapted from Hume (1748)

Causation



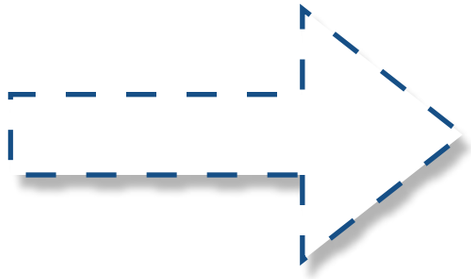
if...



then

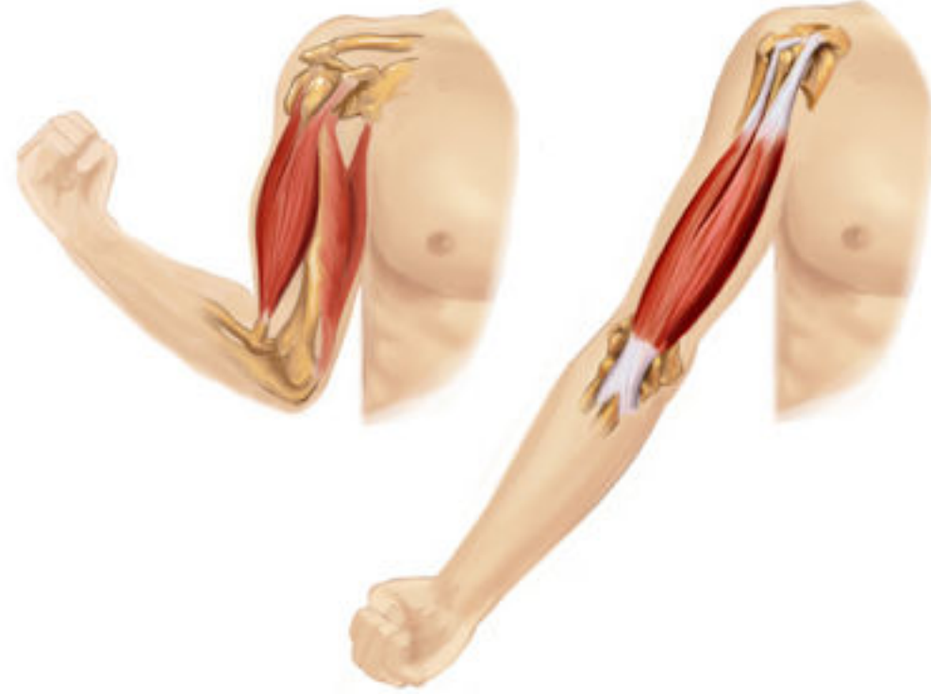
Correlation

if...



often

Pattern (in theory)



if...

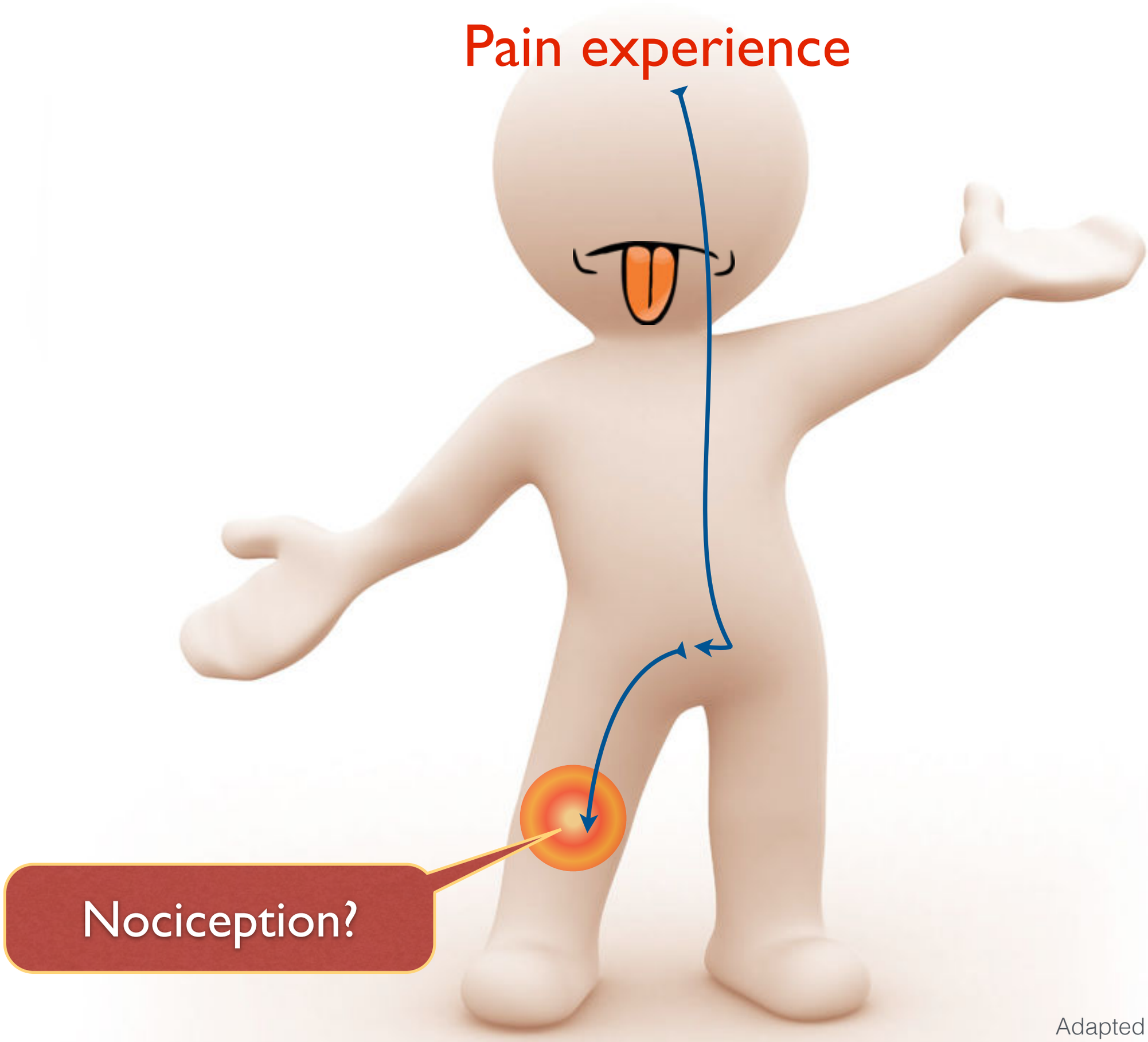
then maybe

?

"When two things occur at **the same time** or within **the same place** we tend to believe that they are causal"

adapted from 'An Enquiry Concerning Human Understanding'
by David Hume (1748)

Pain experience



Adapted from Hume (1748)

How this relates to **pain**

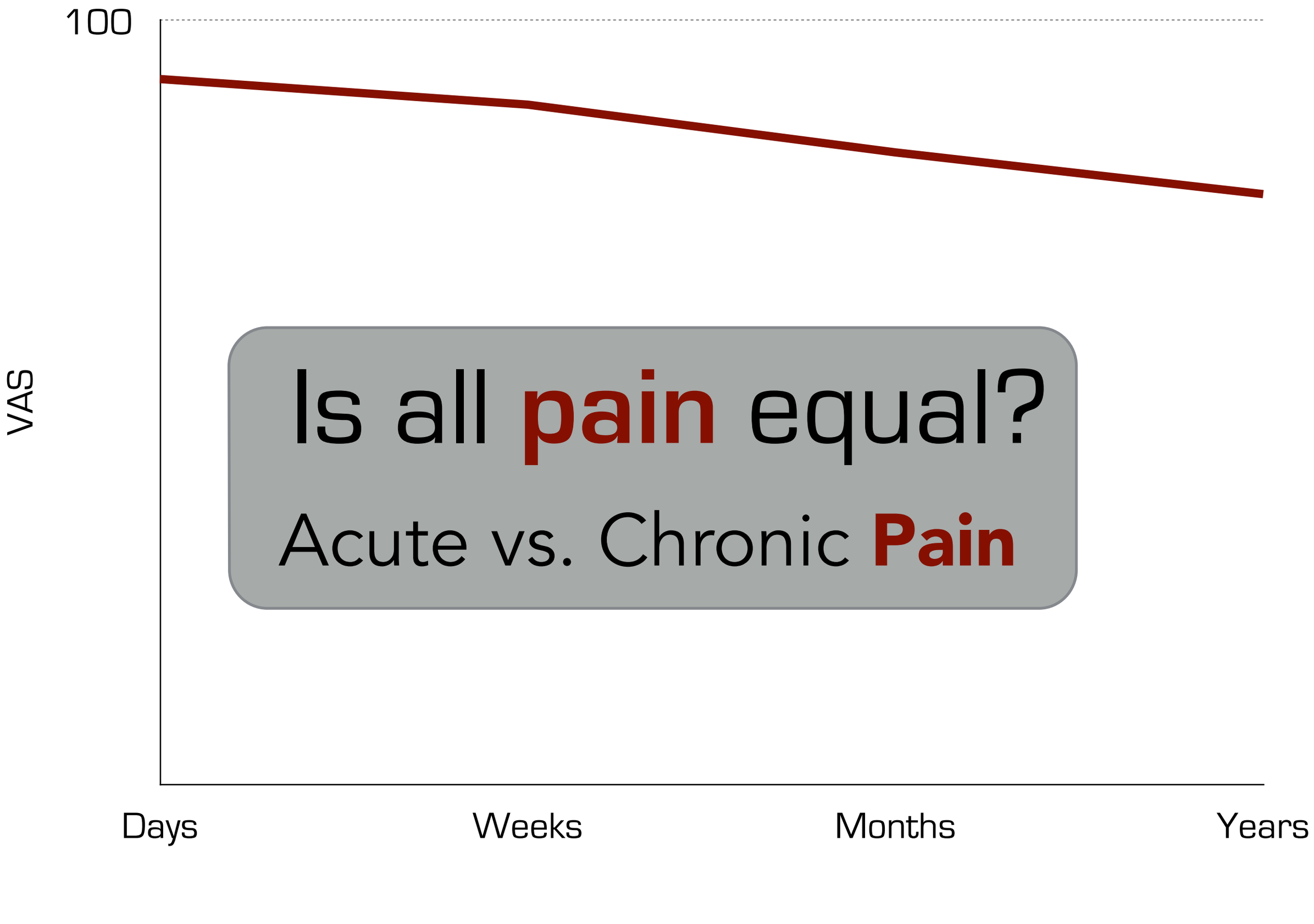
- Pain is not *caused* by nociception
  - because you can be in pain when there is no nociception
- Nociception does not *cause* pain
  - because you can have an injury and not feel it
- Pain *correlate* with nociception
  - experimental pain depends on a relationship between pain and nociception
- We have many excellent *theories* (patterns) regarding the relationship between pain and nociception (neurophysiology)
  - i.e. sensitisation and descending signals
- But current theories only seem to work if the stimulus is nociception
  - current theories are insufficient at explaining pain without nociception

What causes **pain**?

- No one knows!
- But we know that **tissue damage alone should not be a theory for pain** because it wrongly implies that
  - pain is causally related to tissue damage = tissue-damage-repair is the only sensible solution (and everything else is ‘psychogenic’ or ‘covering up’)
  - pain (and all it correlates with) must go away if the tissue is healed
  - more pain must mean more damage or be a sign of insufficient healing
  - there must be undiscovered tissue damage if pain continues
- Clinical implications
  - Understand the patient (‘patient-centred’)
  - Focus on what pain <u>does</u> rather than what it <u>is</u>
  - Understand mechanisms that may explain hyperalgesia (rule in/rule out)

Pain will most likely always:

- Attract you **attention**
- Be **aversive** or unpleasant
- Be experienced **in your body** (including phantoms)
- **Motivate** you to get away from it by
  - learning from the situation you are in (find patterns)
  - behave adequately according to the context you are in (social)
  - prioritise behaviours, thoughts and actions that are believed to be pain relieving
- **Influence** your well-being, mood and communication
- Reflect **changes** that you need to pay attention to


100
VAS
Is all pain equal?
Acute vs. Chronic Pain
Days
Weeks
Months
Years

Acute pain

- Intense and highly **motivating**
  - ‘Get away and learn to avoid it’
- Usually **acknowledged** by society and peers
  - ‘I have had it myself’ and ‘don’t worry you will get over it’ responses
- Usually highly **predictive**
  - ‘Give it a day or two and come back if it hasn’t changed, or if it gets worse’
- More **obstructive** than worrying for most people
  - ‘…but it’s just bad timing. I really don’t have time for this right now’
- Usually very **responsive** to treatments (any kind)
  - Why do you think that most treatments don’t show significant effect after 6-12 weeks (regarding NSLBP - check out Artus et al. 2010 and 2014)
- But acute pain **does not have to correlate with nociception**

Normal (acute?) pain

It hurts!!!

Like the last time…

I must remember
to brush my teeth

I guess there must
be bacteria in my teeth

Chronic pain

- **Exhaustive** and **discouraging**
- **Unacknowledged** by society and peers *and HCPs*
- **Unpredictable** stimulus-response (e.g. movement:pain)
- All **absorbing**: Is there a future?
- Often associated with **mood changes** and stress
- **Loneliness**: Social support becomes much more necessary
  - ‘who will believe me’, ‘what can I believe’, ‘who should I trust’??
- **Life quality**: The pain sensation becomes less of a problem than the effect on life
- **Cure** does occur but no treatment is known to be curative

Complex

It hurts

Should I be scared!

Will it go away?

Does my dentist know what's going on with me?

What am I doing wrong?

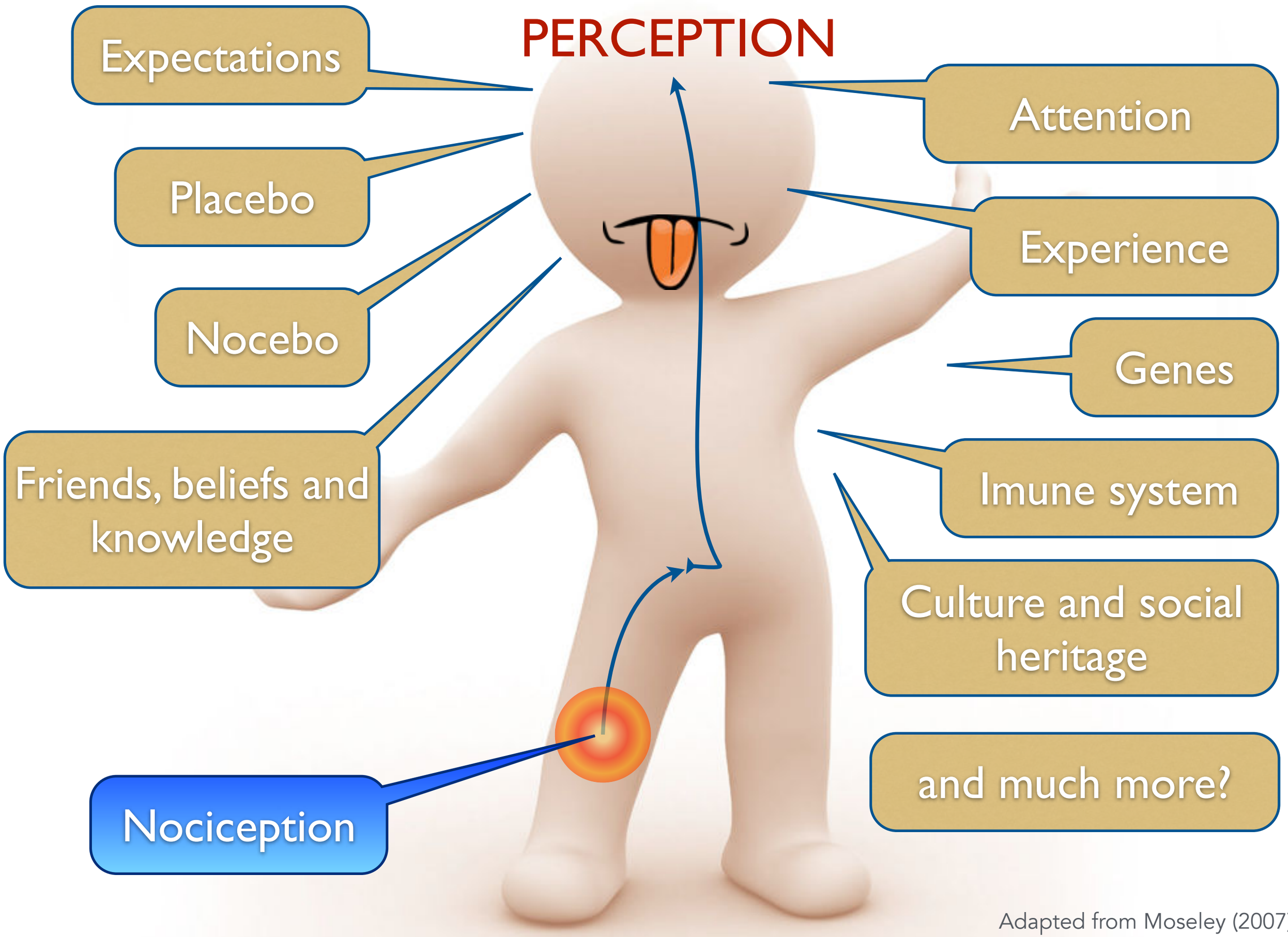
They don't believe me!

I should have never…

Never again will I…

Brush my teeth? How?!?

It's in my teeth



Adapted from Moseley (2007)

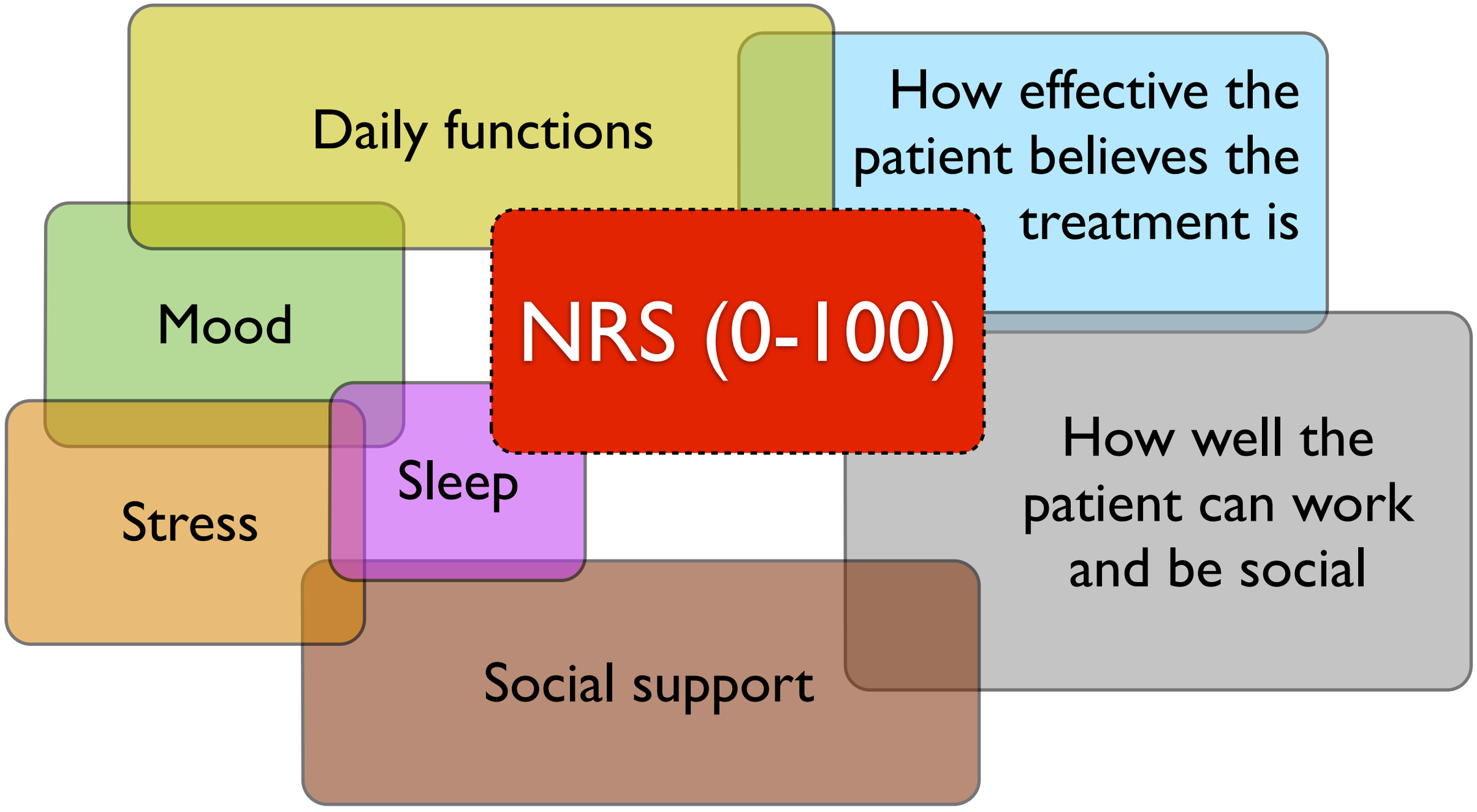
Butler & Moseley *Explain Pain* (2003)

What is it in **this person** that make her hurt in **this context**?

Hierarchy of **Pain** Assessment Techniques

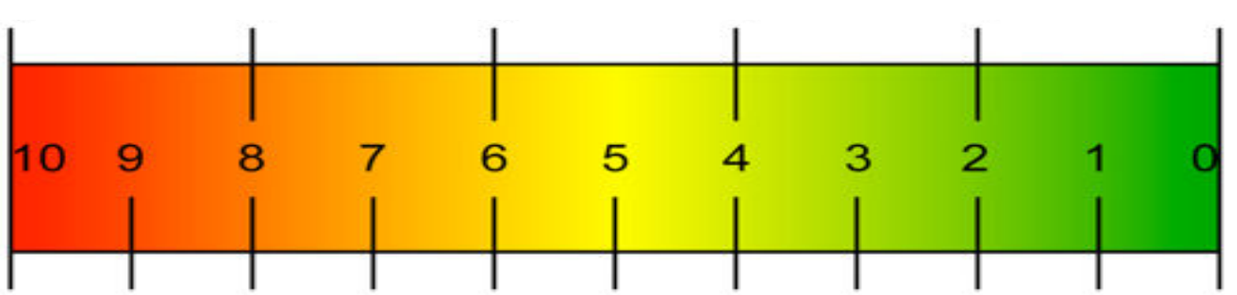
Adapted from Herr et al *Pain Manag Nurs. 2006;7(2):44-52*

Pain is complex - always...



How are you today?

- **Mood** changes (including depression and anxiety)
- **Sleep** disturbances
- **Cardio-vascular** fitness (including metabolic syndrome)
- **Immune** responses
- **Muscular** responses (muscle dysfunction, sarcopenia-like effects)
- Reduced **self-confidence** and meta-cognitive capacity
- **Socio-economic** deroute (job, marriage, parental role…)
- **Perceived injustice** and insufficient support (HCPs, spouse, family, work…)
- **Feeling guilty** (medication abuse, not doing enough, receiving passive treatments…)



Patient reports

Evaluation of the pain *intensity*

NRS

0 1 2 3 4 5 6 7 8 9 10

VAS

Ingen smerter

Værst tænkelige smerter

VRS

Ingen smerter (0)

Milde smerter (1-3)

Moderate smerter (4-6)

Voldsomme smerter (4-7)

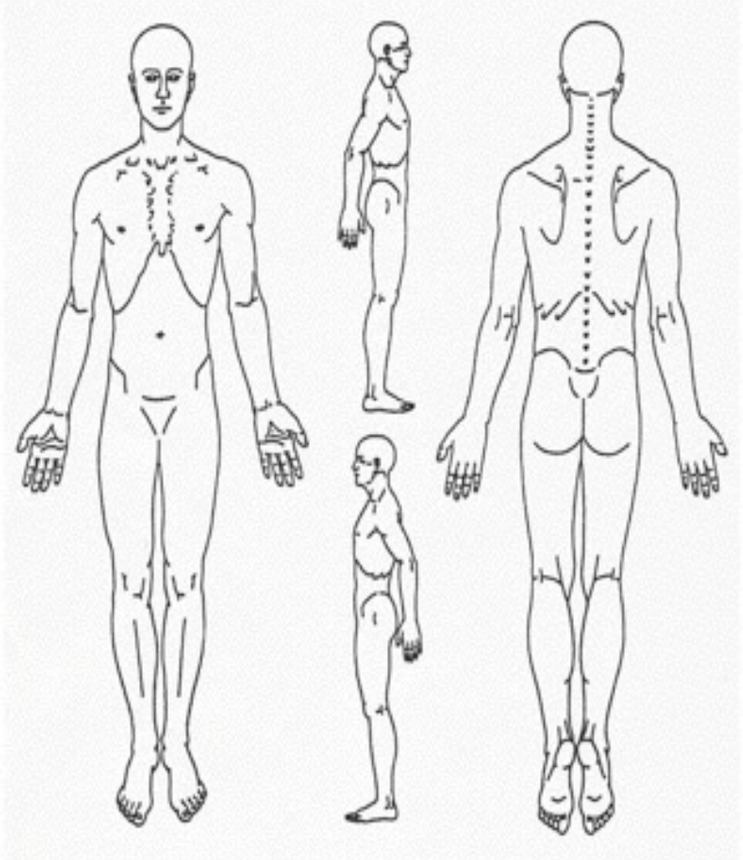
Anbefales til ældre uden eller med mild demens

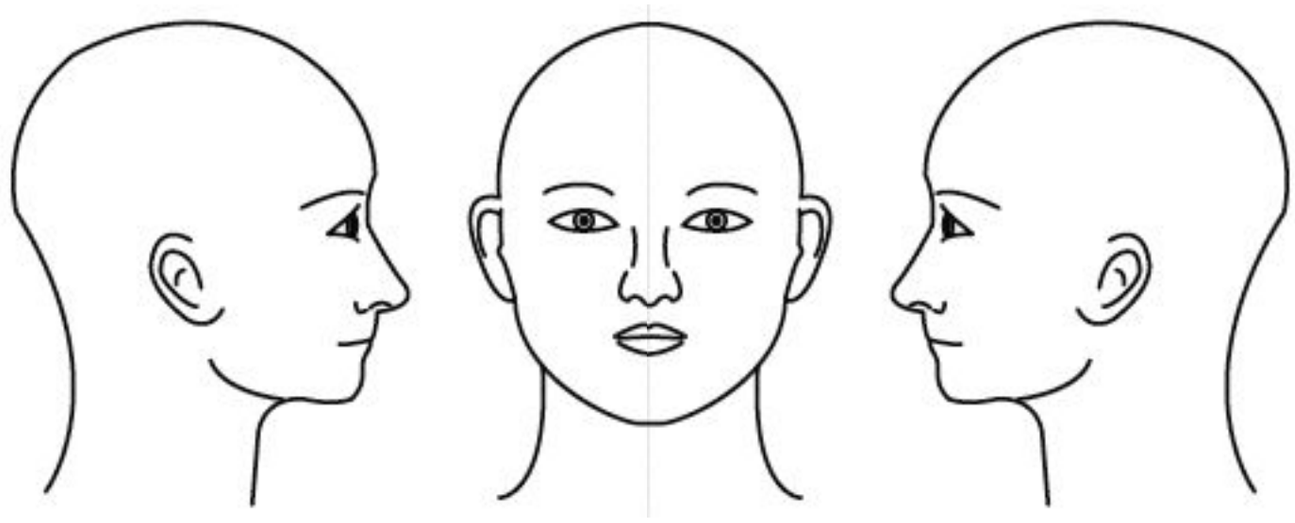
Faces Pain Scale

Pain drawing

Please mark the figures below with the letters that best describe the sensation or pain you are feeling. Please mark areas where pain radiates or spreads with a ↑, ↓, or ←, → arrow to indicate the direction of radiating pain.
(Include all affected areas)

A =	Ache	B =	Burning	R =	Radiating Pain	D =	Dull Pain
N =	Numbness	S =	Stabbing	P =	Pins & Needles	O =	Other





Please indicate how you would rate your pain (LOW) 0 1 2 3 4 5 6 7 8 9 10 (HIGH)

NAME: (please print)_____

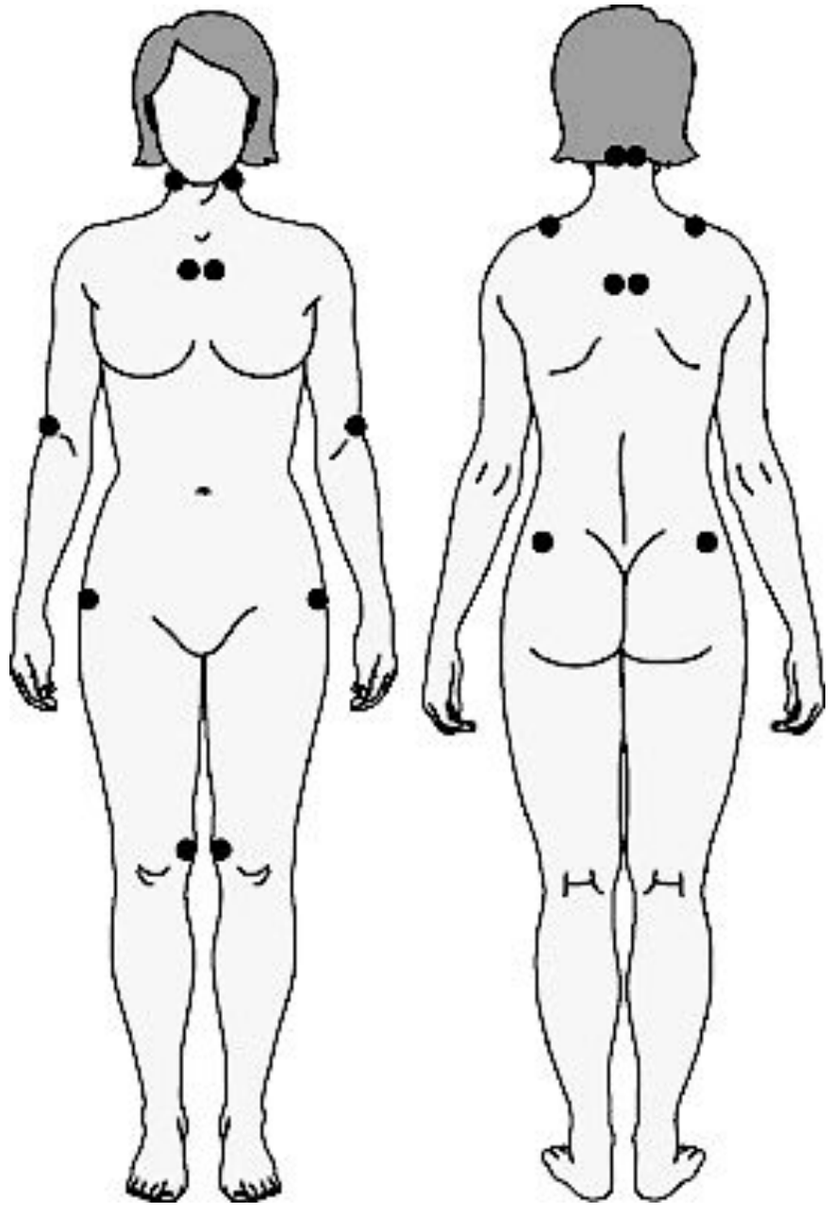
How long have you experienced neck/back pain? _____ Years _____ Months _____ Weeks

Is this your first episode of neck/back pain? _____ YES _____ NO

SIGNATURE:_____ DATE:_____

KLD 03/06

Palpation

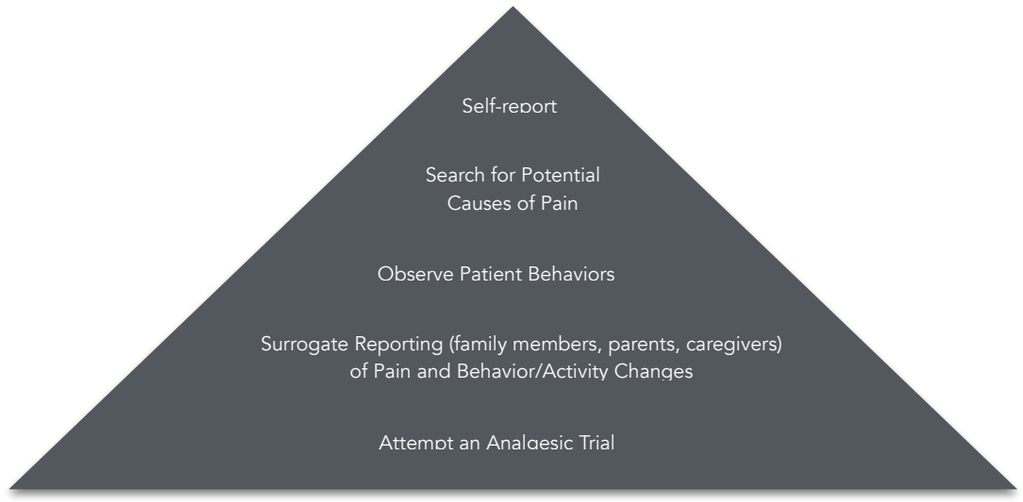


Patient Specific Functional Scale

Pain provoking functions (disablities)

Describe the function:	**0 = cannot perform the task at all** **10 = can functionally perform with no restrictions/as before**
How would you rate your best, worst and average pain?	
Does pain stop you from this activity?	
How does the pain react to accumulation of activity?	
How long does it take for the pain to reach baseline again?	
0-100 (NRS) - best and worse during this activity?	

Adapted from:
Stratford, P. (1995). Assessing disability and change on individual patients: a report of a patient specific measure. Physiotherapy Canada.



#2: Search for potential causes of pain

NOCICEPTION

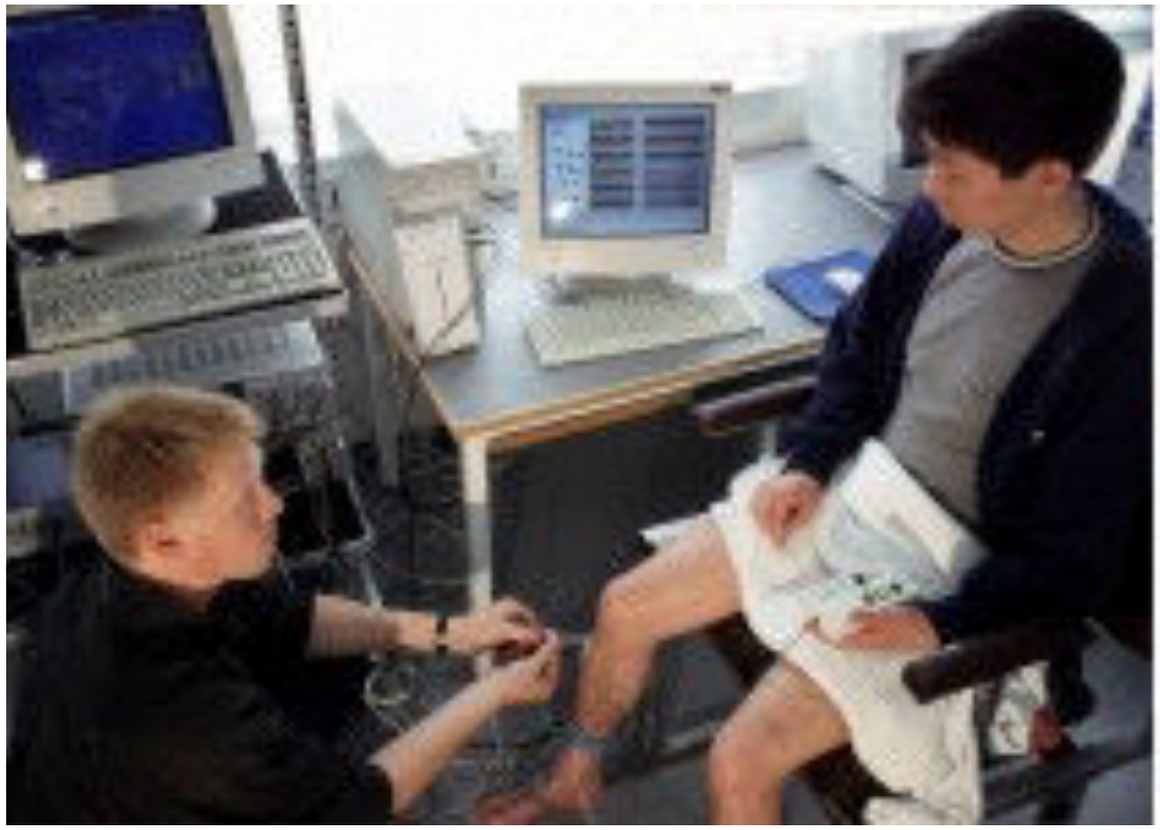
- Tissue damage
- High threshold stimuli
- Sensitisation (LTP)
- Genetics?
- Cognition?

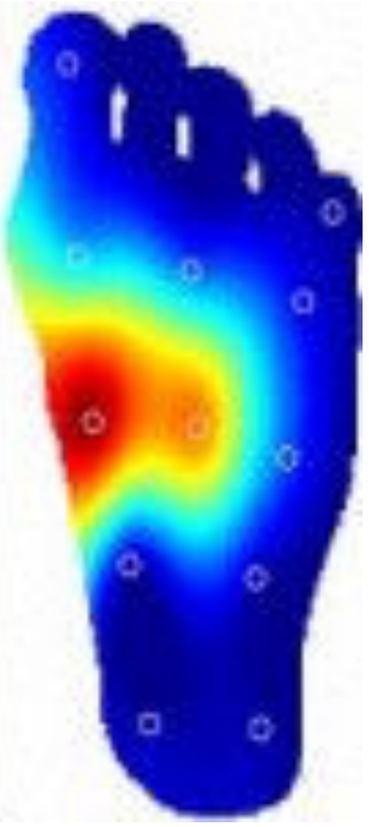
PAIN

- Expectations
- Mood
- Sleep
- Social support
- Acceptance and understanding
- Health Care (providers, payers, law…)
- The attitudes of the dentists (and significant others)
- Genetics

Nociceptive Withdrawl Reflex

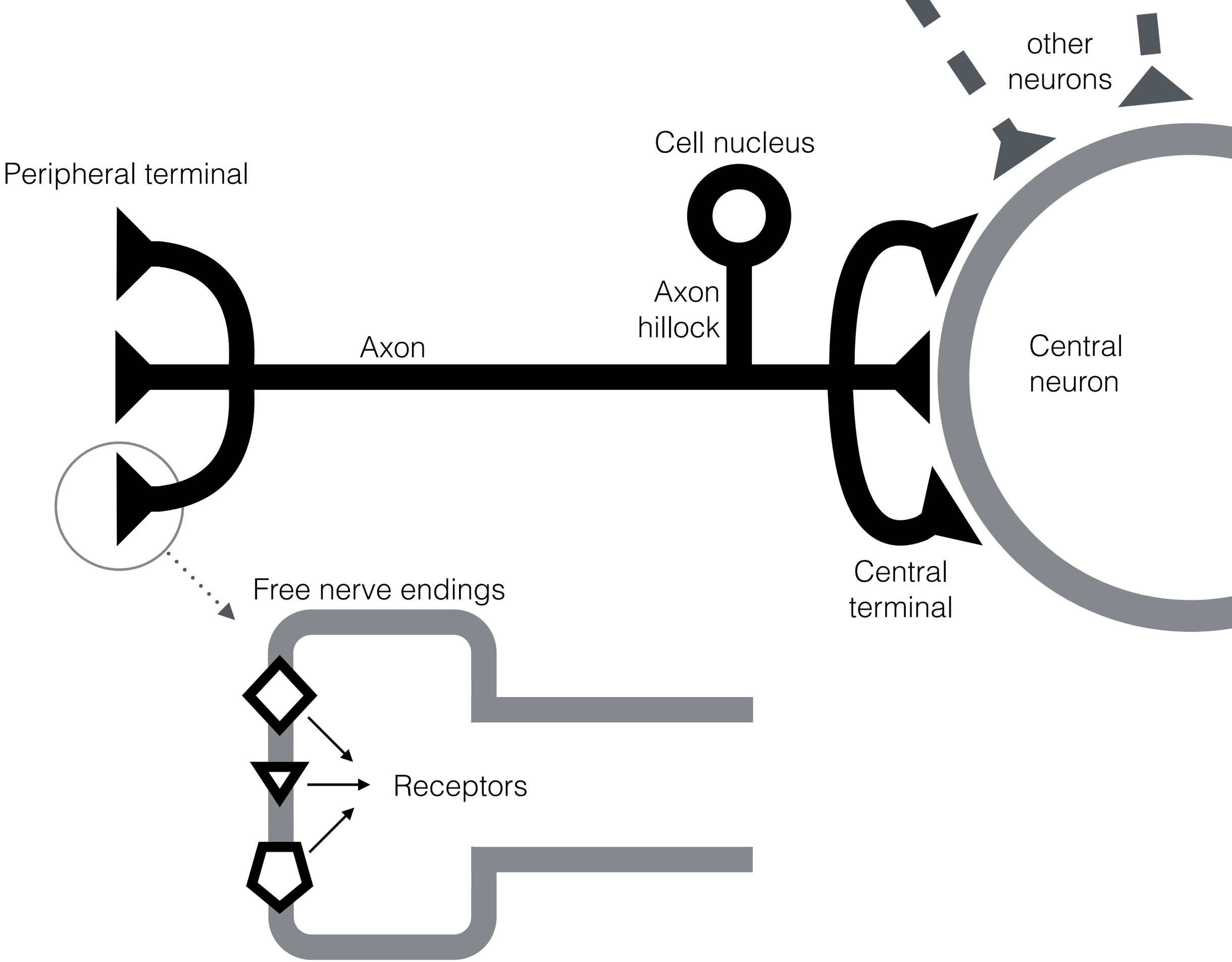
- ‘The Sherrington Reflex’
- Motor response to nociceptive (and other) stimuli
- No strong correlation with other nociceptive responses





The FLARE response

- axonal **reflex**
- not nociceptive specific
- possible correlation with skin irritants (including pain)


other
neurons
Cell nucleus
Peripheral terminal
Axon
hillock
Axon
Central
neuron
Central
terminal
Free nerve endings
Receptors

Acute tissue injury

Neural

Vacular

Cellular

Axonal reflex

Peptide exocitose

CGRP

Sub P

Cytokine release

NGF/GDNF release from Schwannske Celler

Vasocontriction

Vasodilation

Increased permability

Chemotaxis of neutrophils, macrophages, plasma, T-Cells, mast cells etc.

Proteins released from injured cells

Chemokines, bradykinin, serotonin, histamine, neutrophils, macrophages

Destruction of bacteria and removal of debris

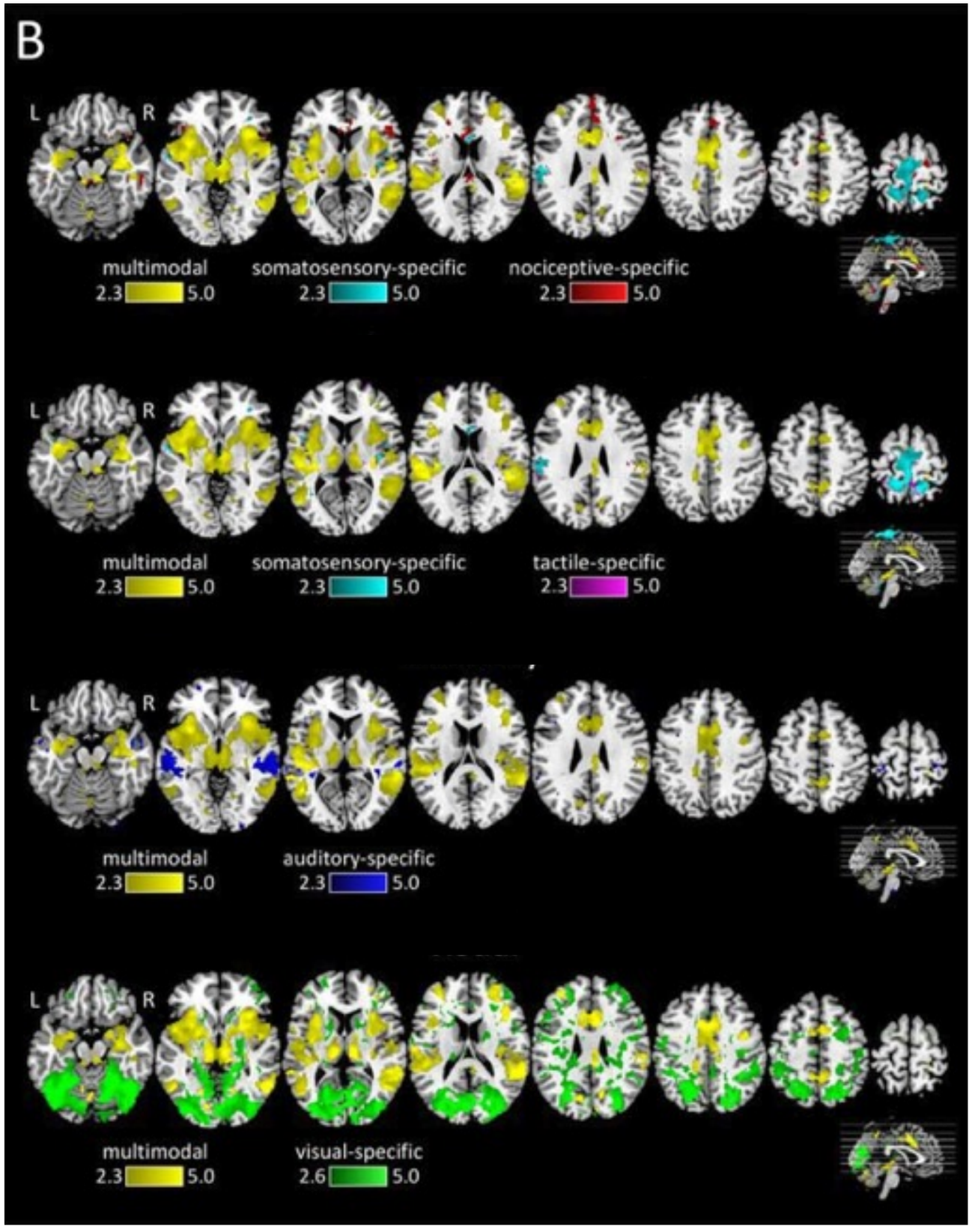
Is neuro imaging the answer we are looking for?

What's causing the activity?

"The pain neuromatrix is dead and it is time for pain research to be more critical"

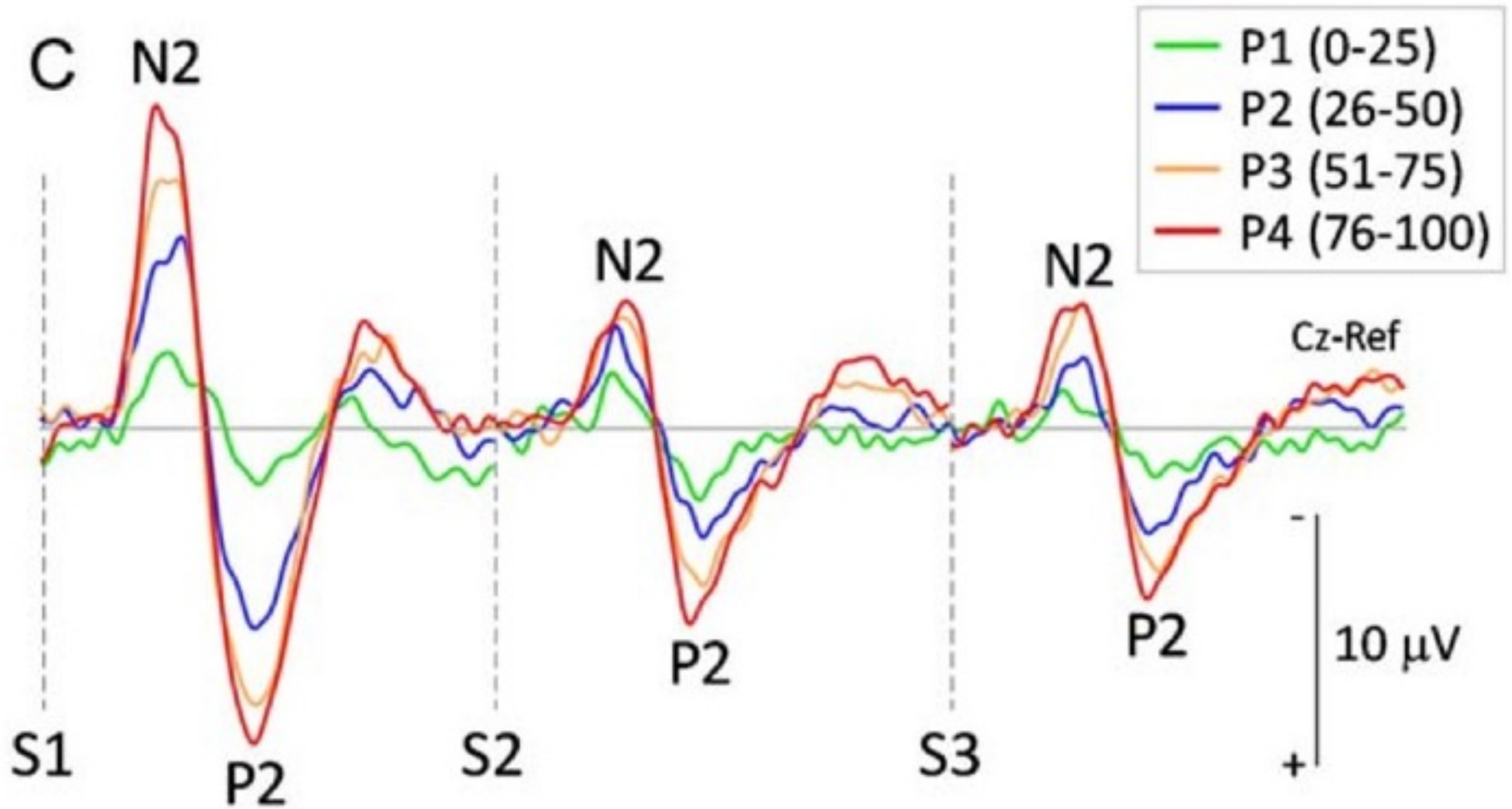
"Stimulus-specificity can be falsified"

Adapted from prof. Iannetti @ Wellcome Trust scientific congress, Cambridge 2015



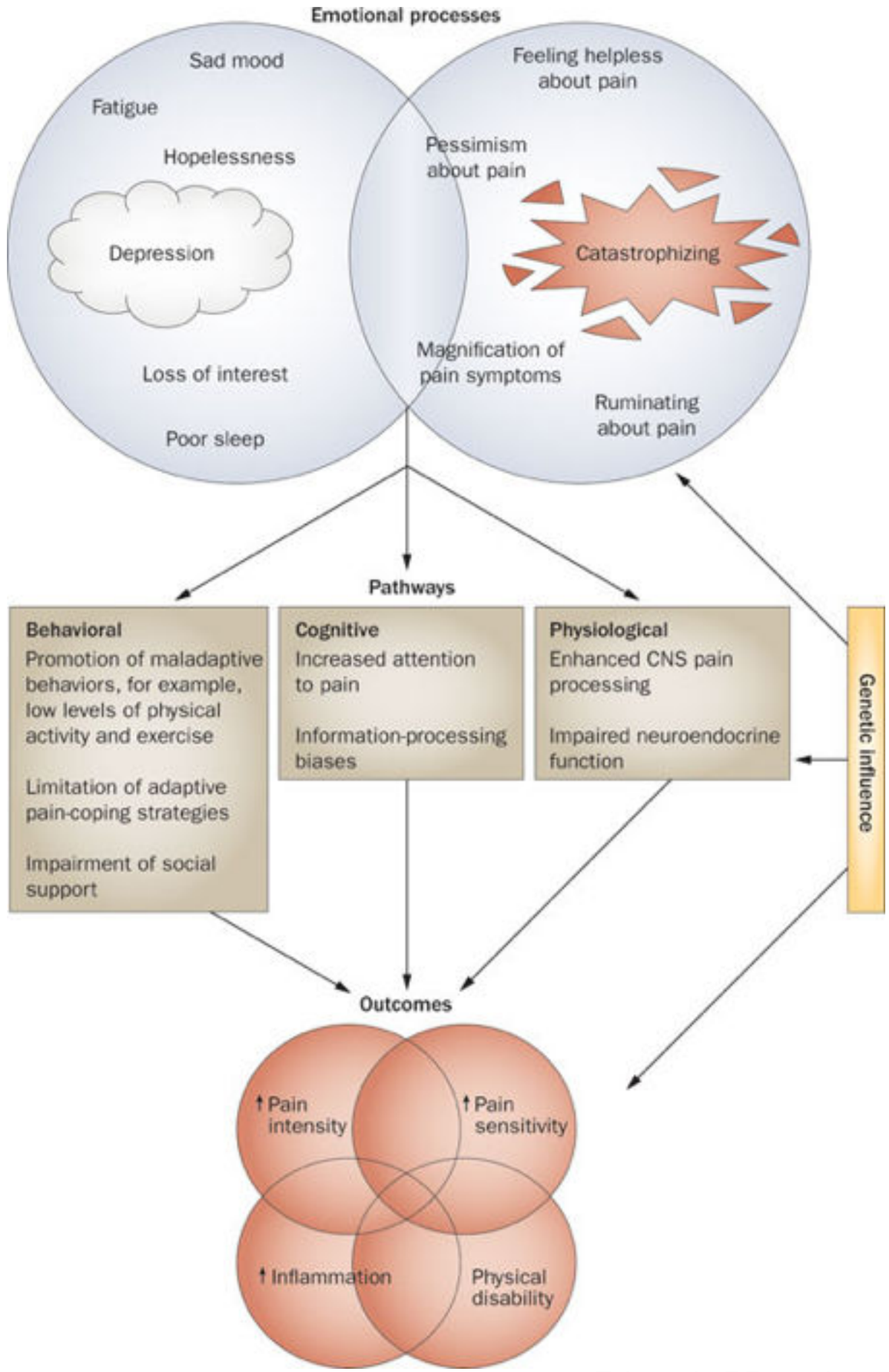
Legrain et al. (2011)

Salience rather than nociception?



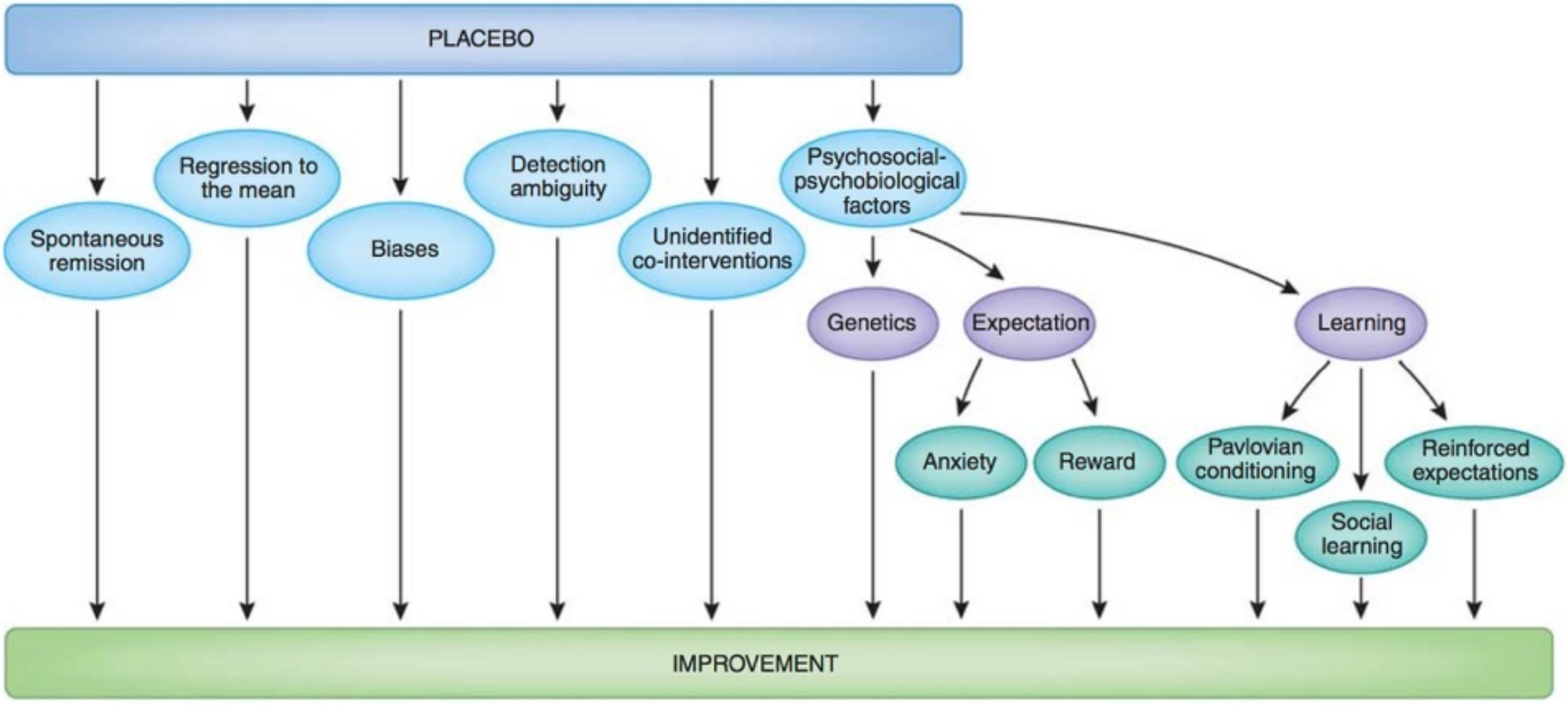
Legrain et al. (2011)

Can **pain** be a conditioned (learned) response?



Edwards RR et al. (2011)

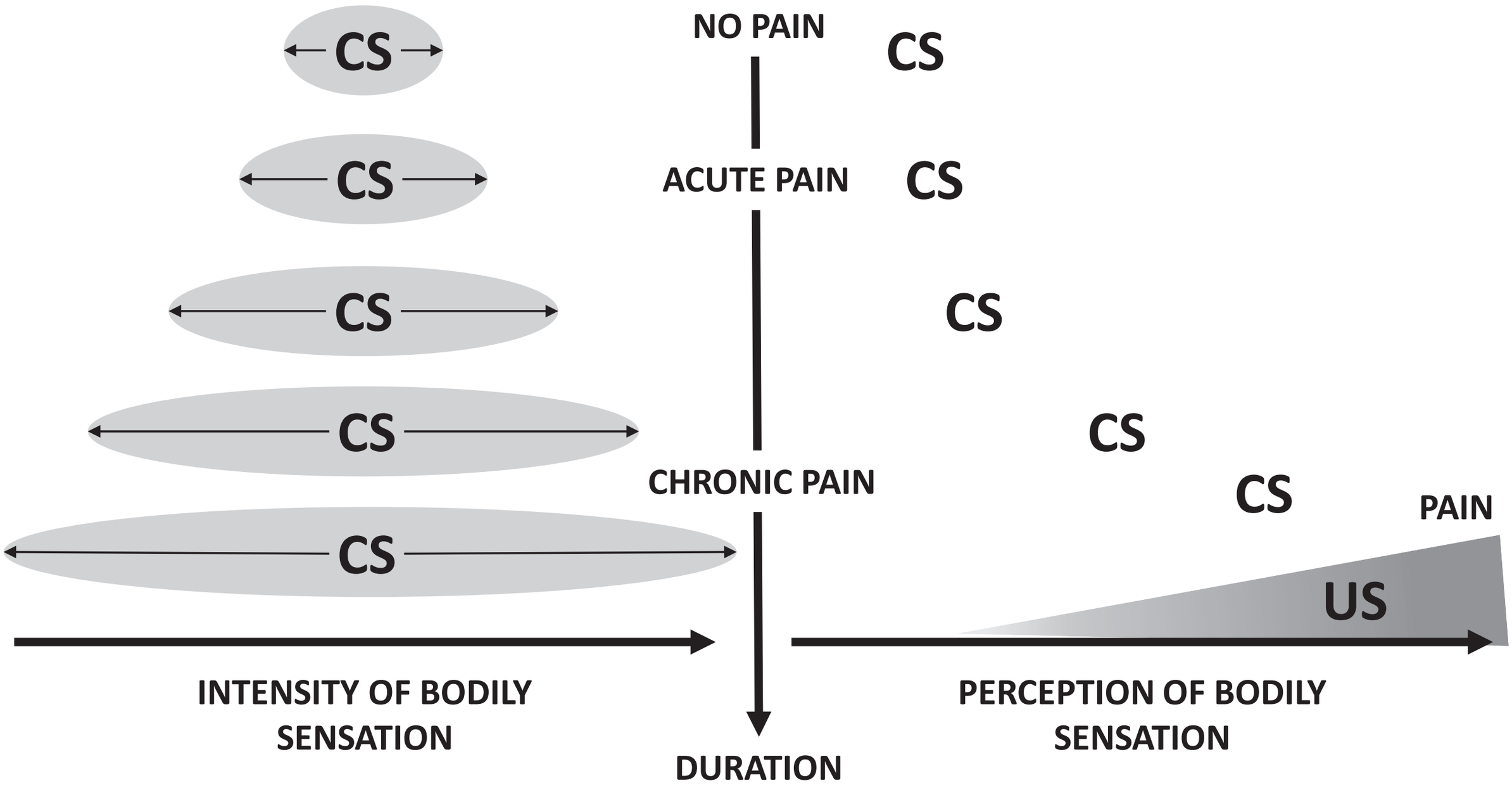
Placebo mechanisms



Benedetti F (2010)

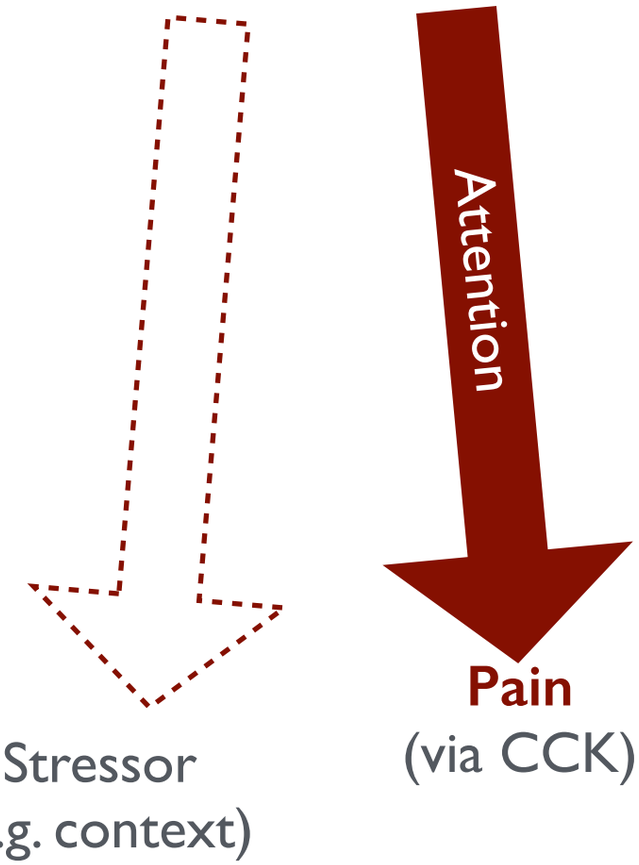
Fear and learning

J. Zaman et al. / Neuroscience and Biobehavioral Reviews 51 (2015) 118–125

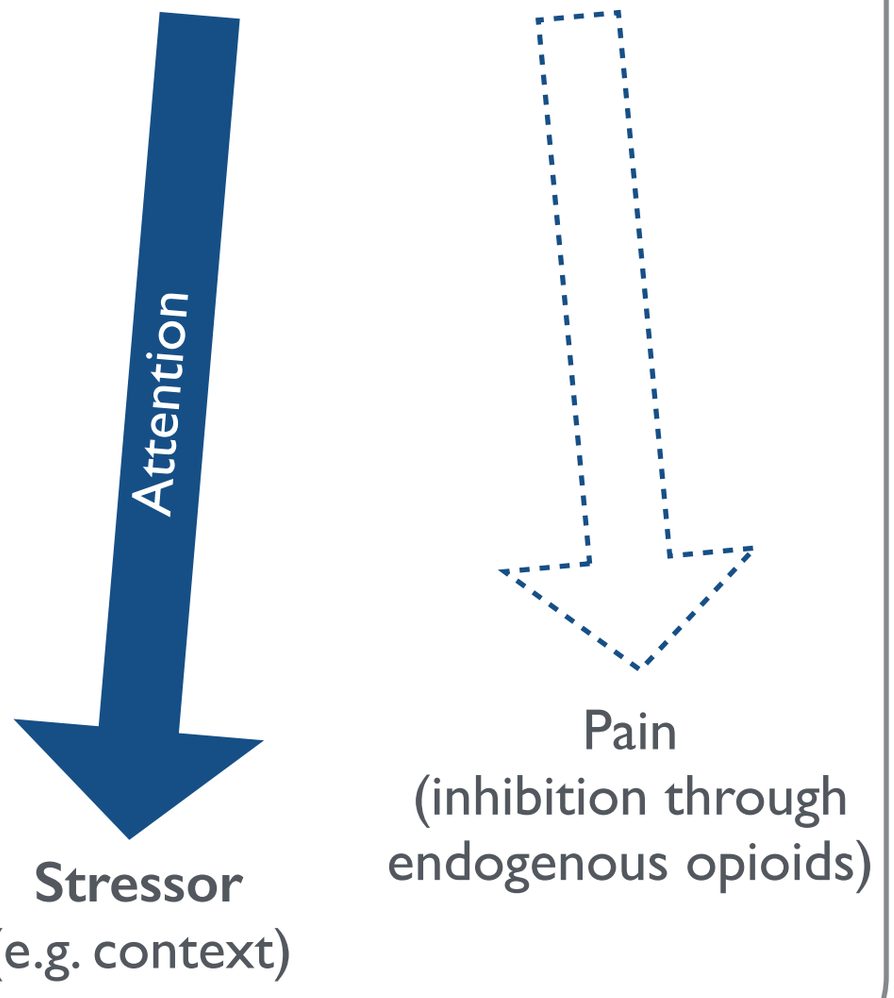


Stress and pain

Fear/anxiety related pain (nocebo)

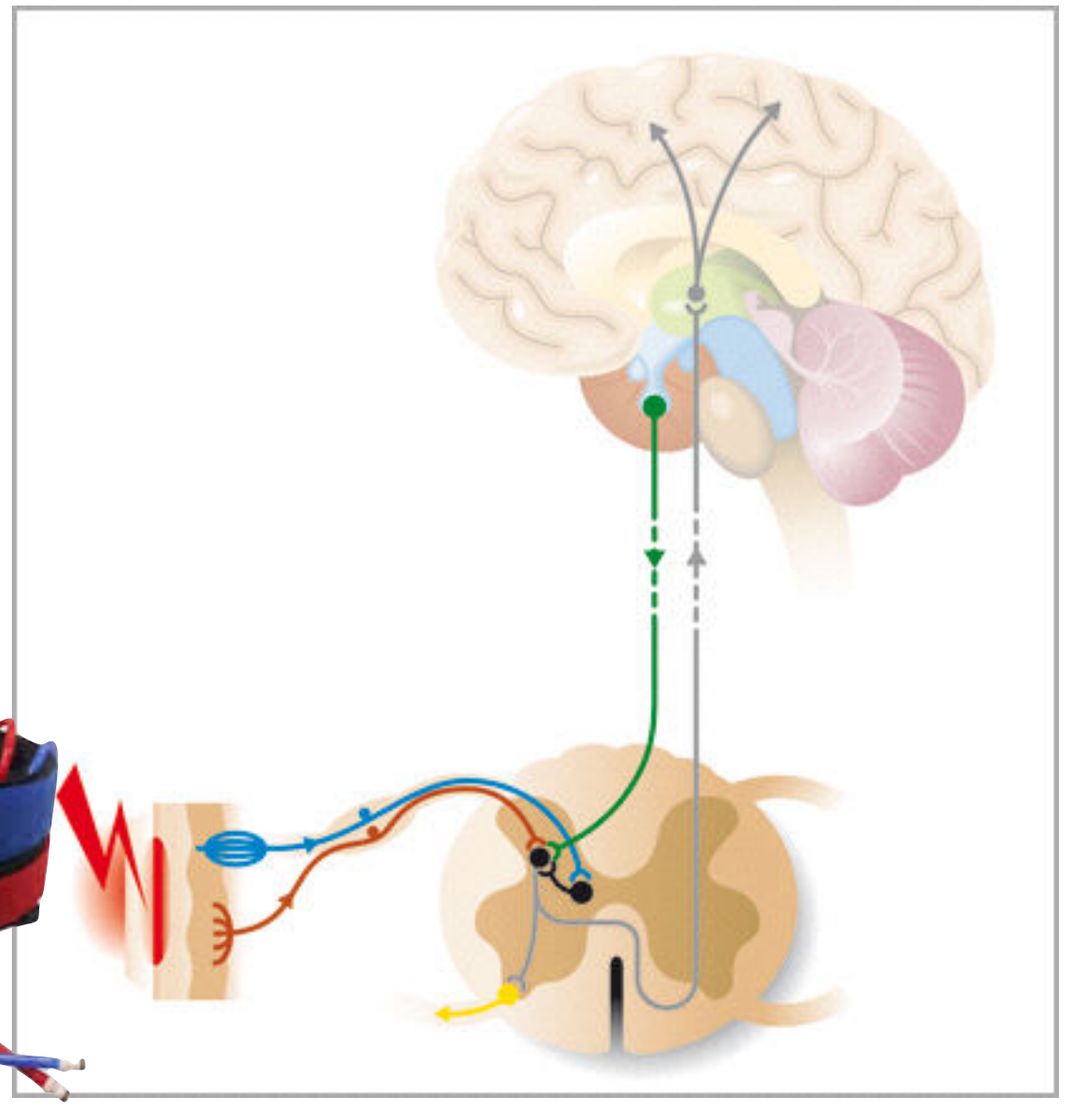


Stress-induced analgesia



Adapted from Benedetti (2011) Oxford Press

Could **pain** be pain-**reducing**?

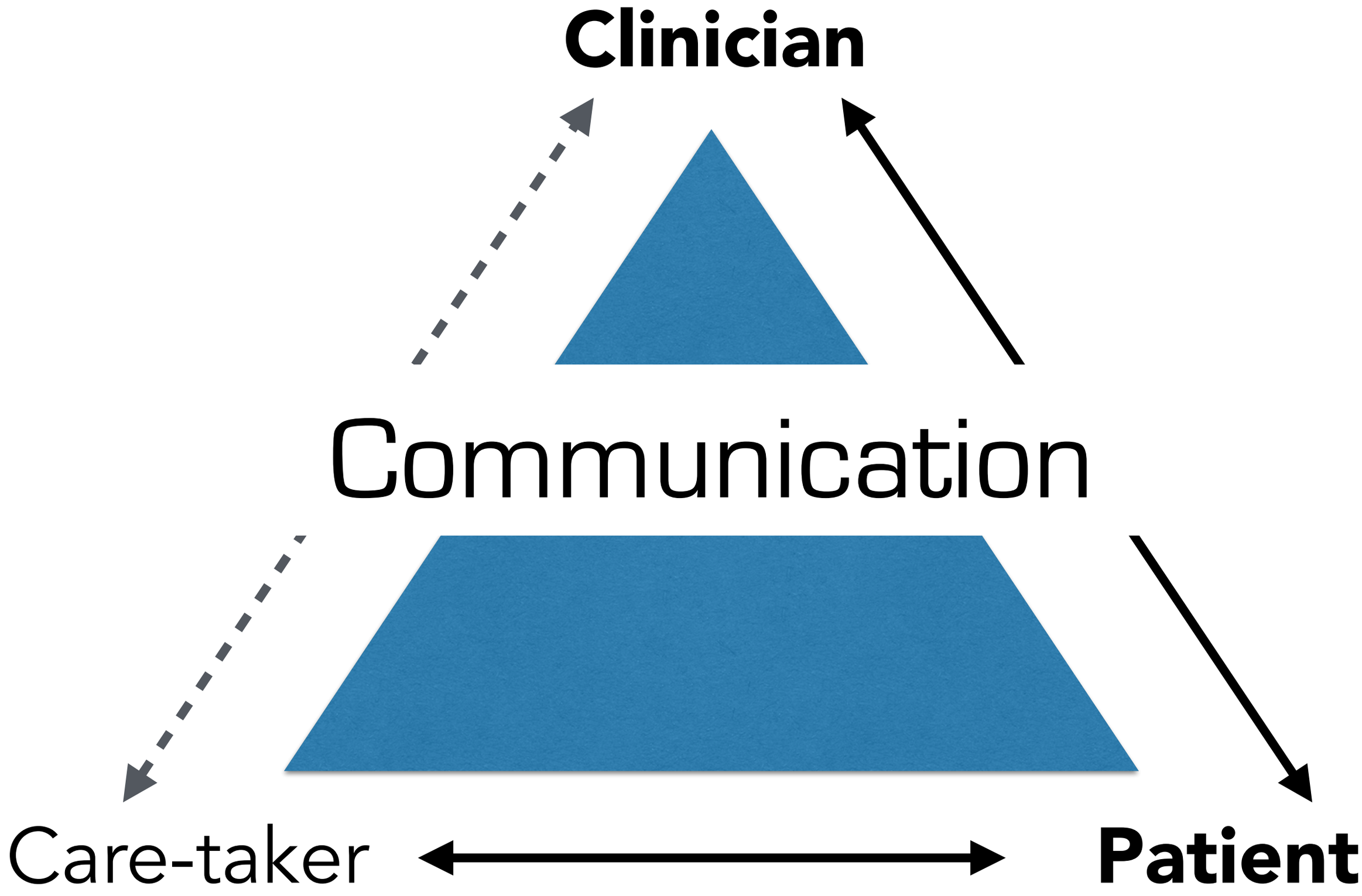


Modulation is all about balance

Think about modulation as a way for the body to get just the right amount of response in any given situation. And remember that it is plastic!

PRO-NOCICEPTIVE MECHANISMS

ANTI-NOCICEPTIVE MECHANISMS


Clinician
Communication
Care-taker
Patient

The tool box

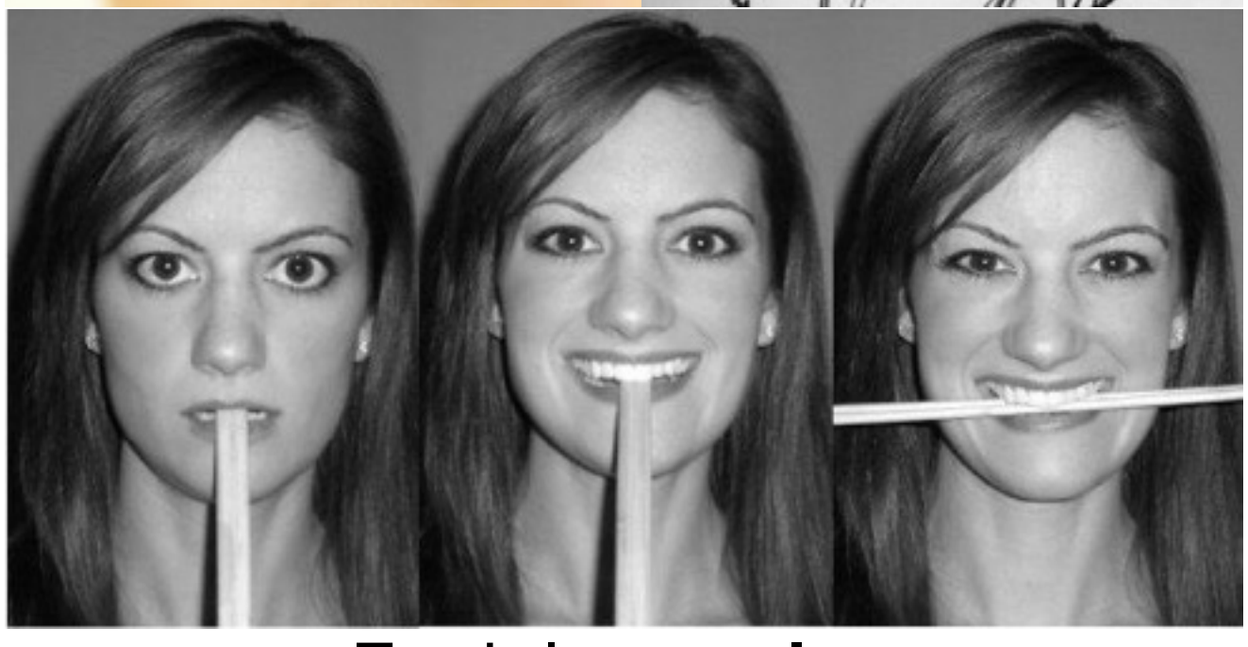
Skills needed in ‘BPS’ practice

- patient-education (teaching)
- tools of motivation and negotiating
- awareness to non-verbal communications
- indirect data collection and influence via significant others
- task-specific qualifications (e.g. dental surgery)

E.M.P.A.T.H.Y.

Eye contact

Posture



Facial **muscles**

Riess & Kraft-Todd, Academic Medicine, Vol. 89, No. 8 / August 2014

E.M.P.**A.T.H.**Y.

Affective states

Riess & Kraft-Todd, Academic Medicine, Vol. 89, No. 8 / August 2014

E.M.P.**A.T.H**.Y.

10%
of conflicts is due to
difference in opinion.

90%
is due to wrong
tone of voice.

Tone of your voice

Riess & Kraft-Todd, Academic Medicine, Vol. 89, No. 8 / August 2014

E.M.P.**A.T.H**.Y.

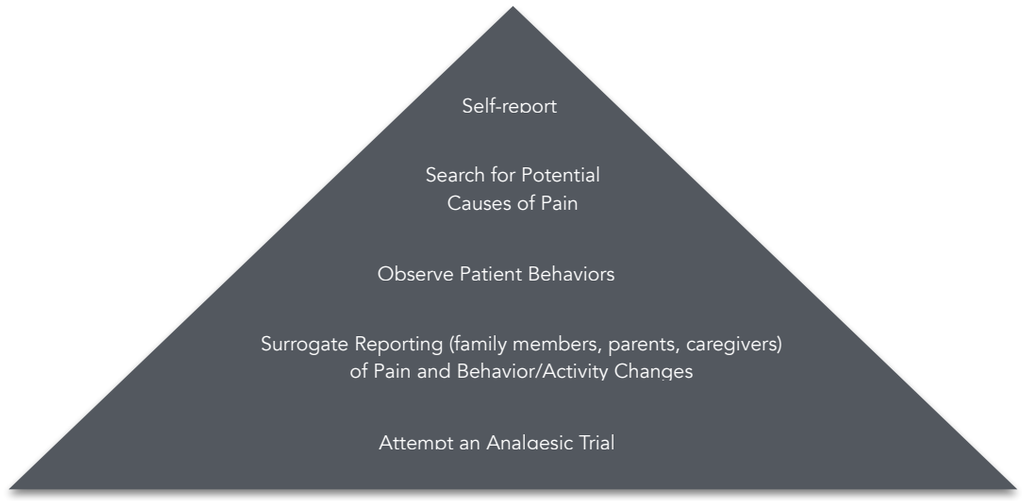
Riess & Kraft-Todd, Academic Medicine, Vol. 89, No. 8 / August 2014

E.M.P.A.T.H.**Y**.

affective vs
cognitive empathy!

(**Your** response)

Riess & Kraft-Todd, Academic Medicine, Vol. 89, No. 8 / August 2014



#3: Observe patient behaviours

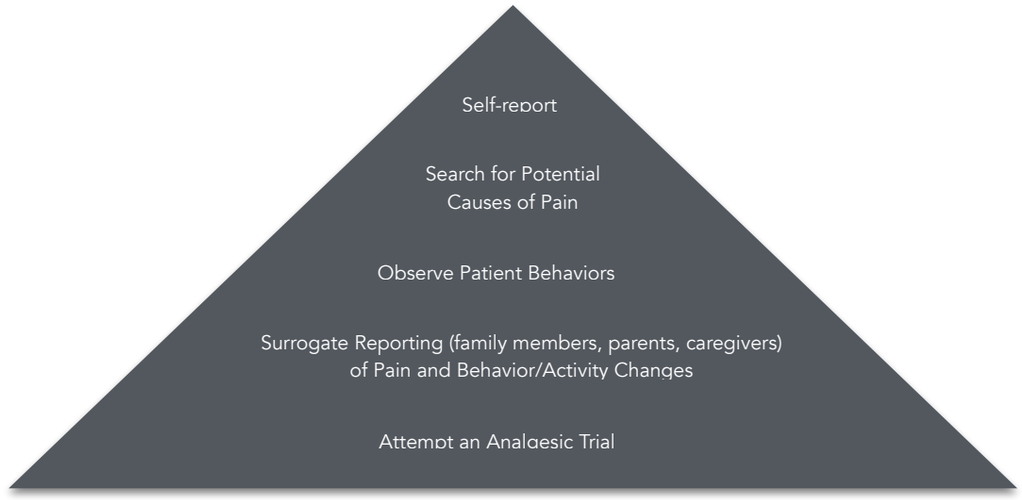
Observations

- Grimassing
- Behaviour
- Verbalising

What **signs** would you look for in the face of a patient to support your hypothesis of **pain**?

Verbalising & behaviour

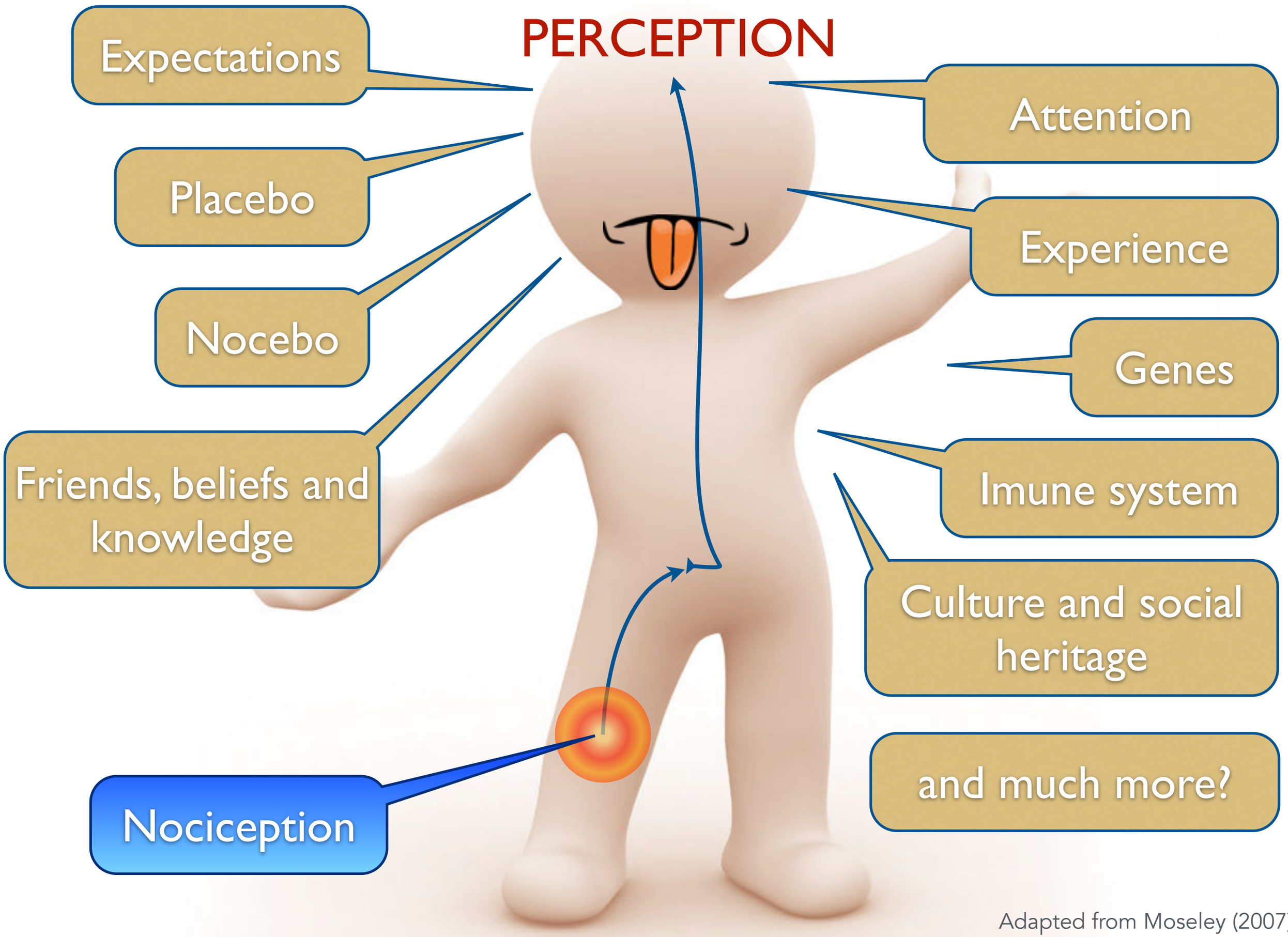
- Sighing
- Moaning
- ‘Growling’ and ‘Grunting’
- Shouting
- Loud respirations or irregular respiration
- Asking for help or attention
- Agression (words, gestures or behaviour)
- Rigidity
- Tension
- Protective gestures or behaviors
- Rocking movement
- Reduced ROM or other (sudden) changes in mobility



#4: Surrogate reporting

Possible data sources

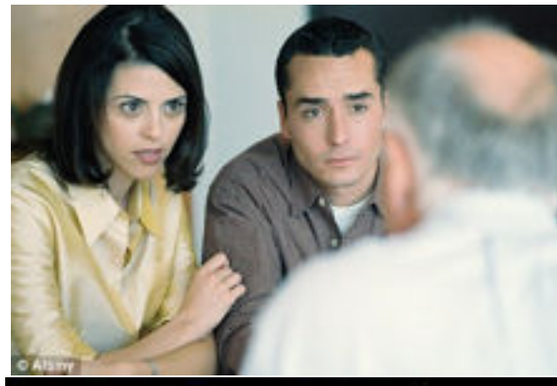
- Significant others (spouse, partner, child/parent)
- Friends and other family
- Caregivers and GP
- Colleagues, neighboughs and business partners

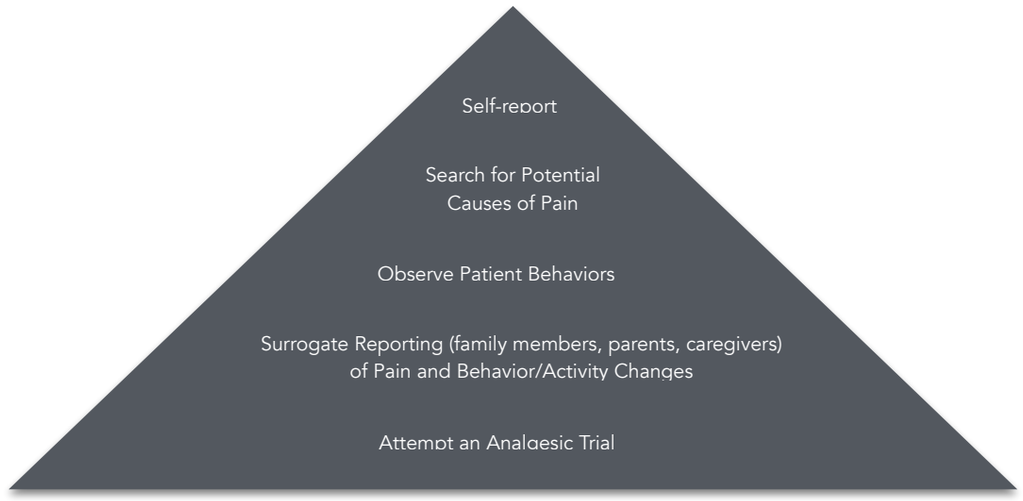


Adapted from Moseley (2007)

Educate

- Sharing knowledge that gives you <u>confidence</u> in the benign nature of the condition
- Make sure the patient knows why you think it is valid for them (not for 'someone like them')
  - What's wrong with me?
  - What will happen to me?
  - How do I explain this (once I buy it)
- Share and exercise **explanations, diagnosis and narratives**
- Focus on the role of the spouse/family if the patient is cognitively impaired

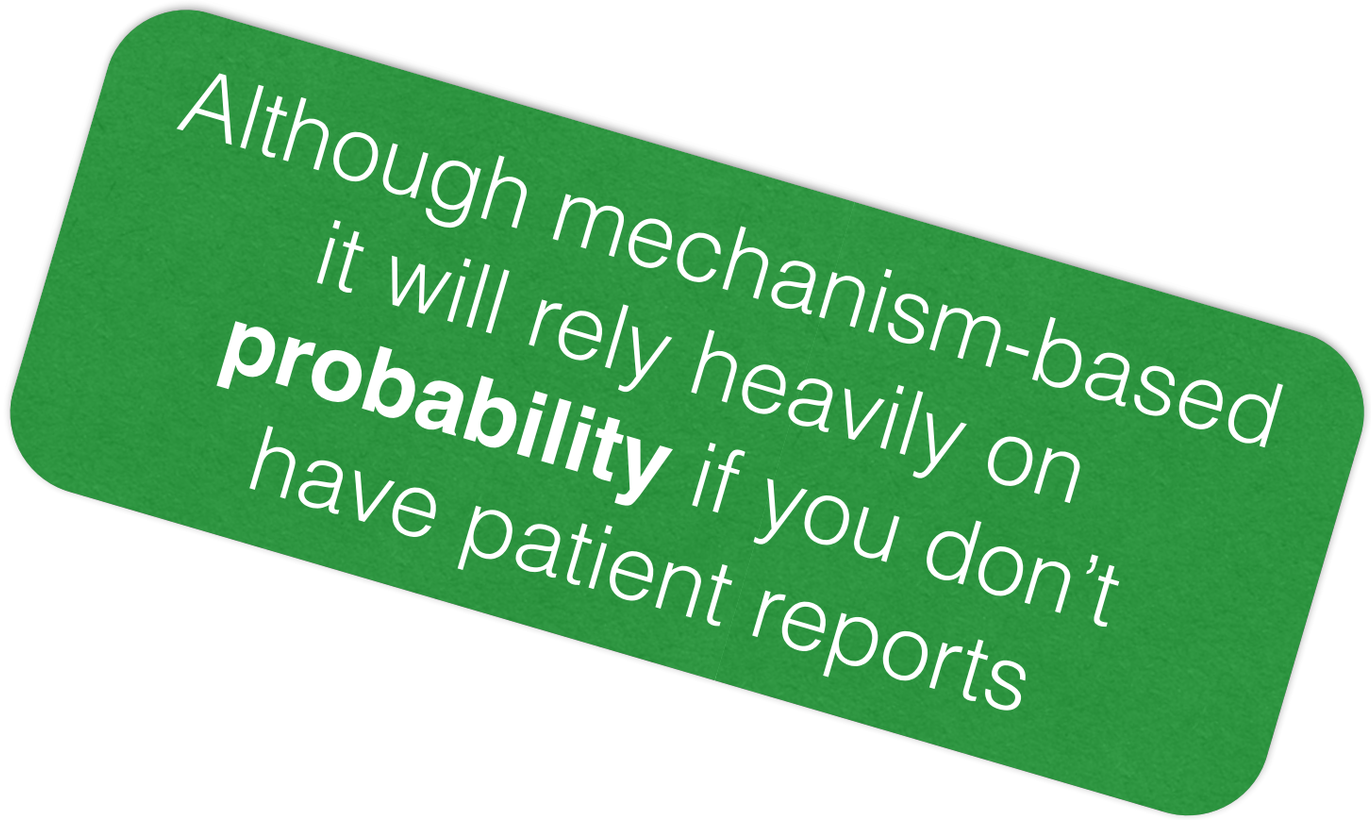




#5: Attempt analgesic trial

Pharma

- Local anesthetics
- Non-opioids
  - Paracetamol
  - NSAIDs
- Opioids
- Anti-depressants
- Anti-convulsants



Thank you for your attention

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