Understanding the Brain: The BioPsychoSocial Model

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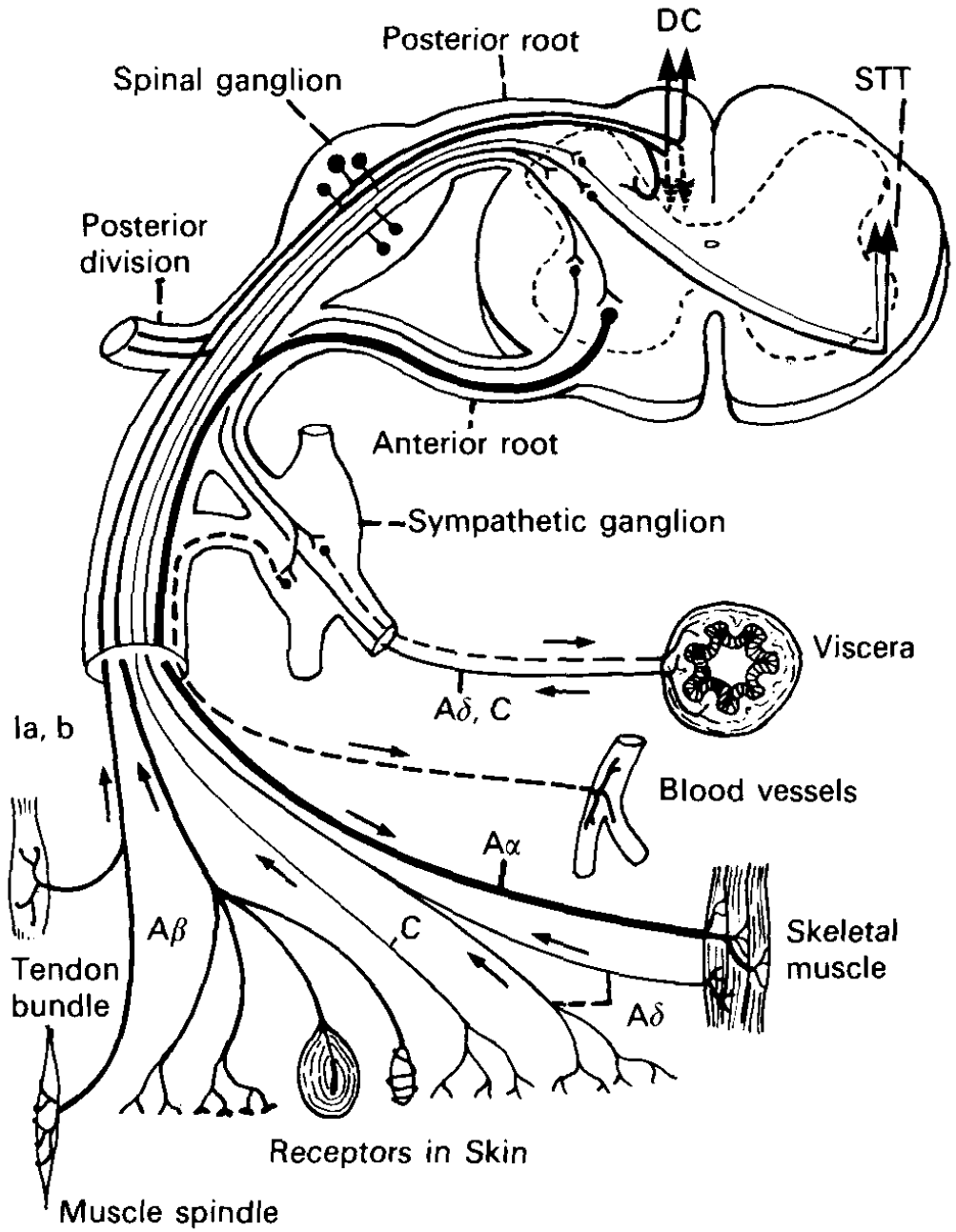
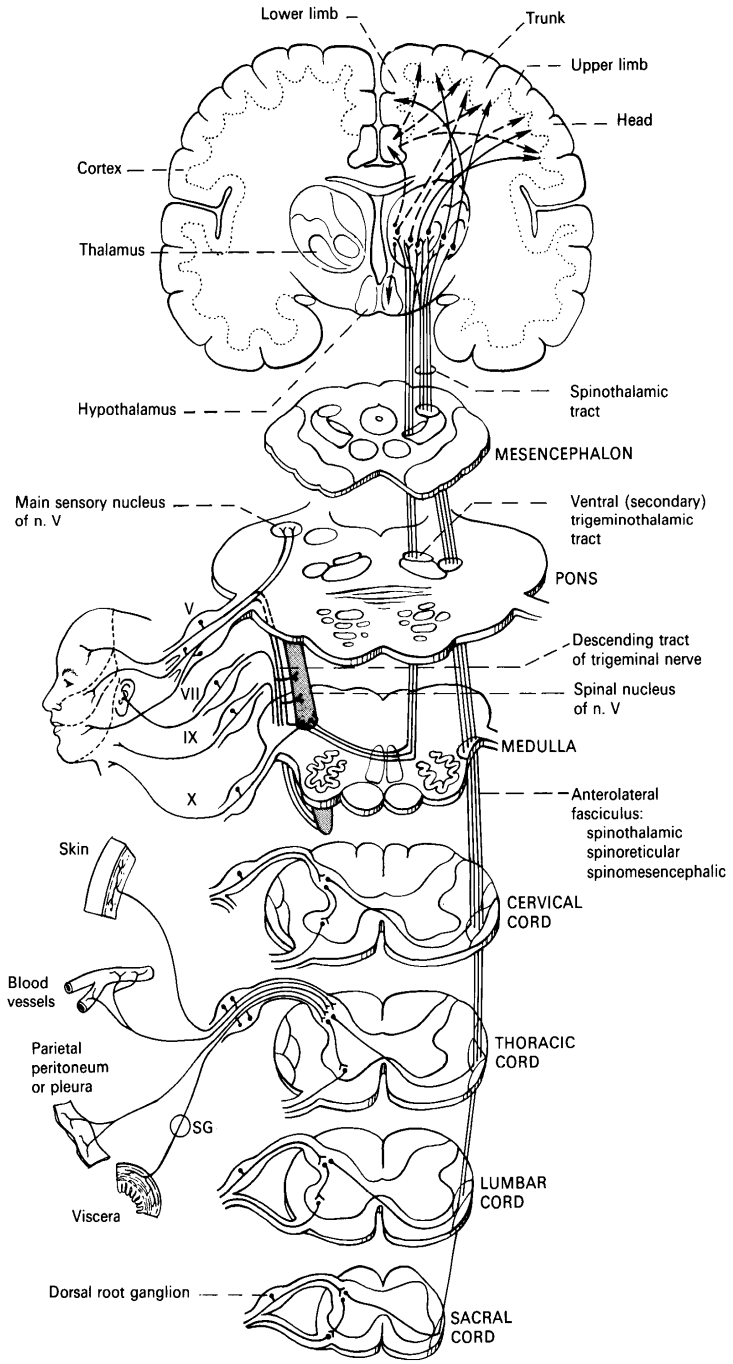
Sensory Receptor and Motor Activation Pathways



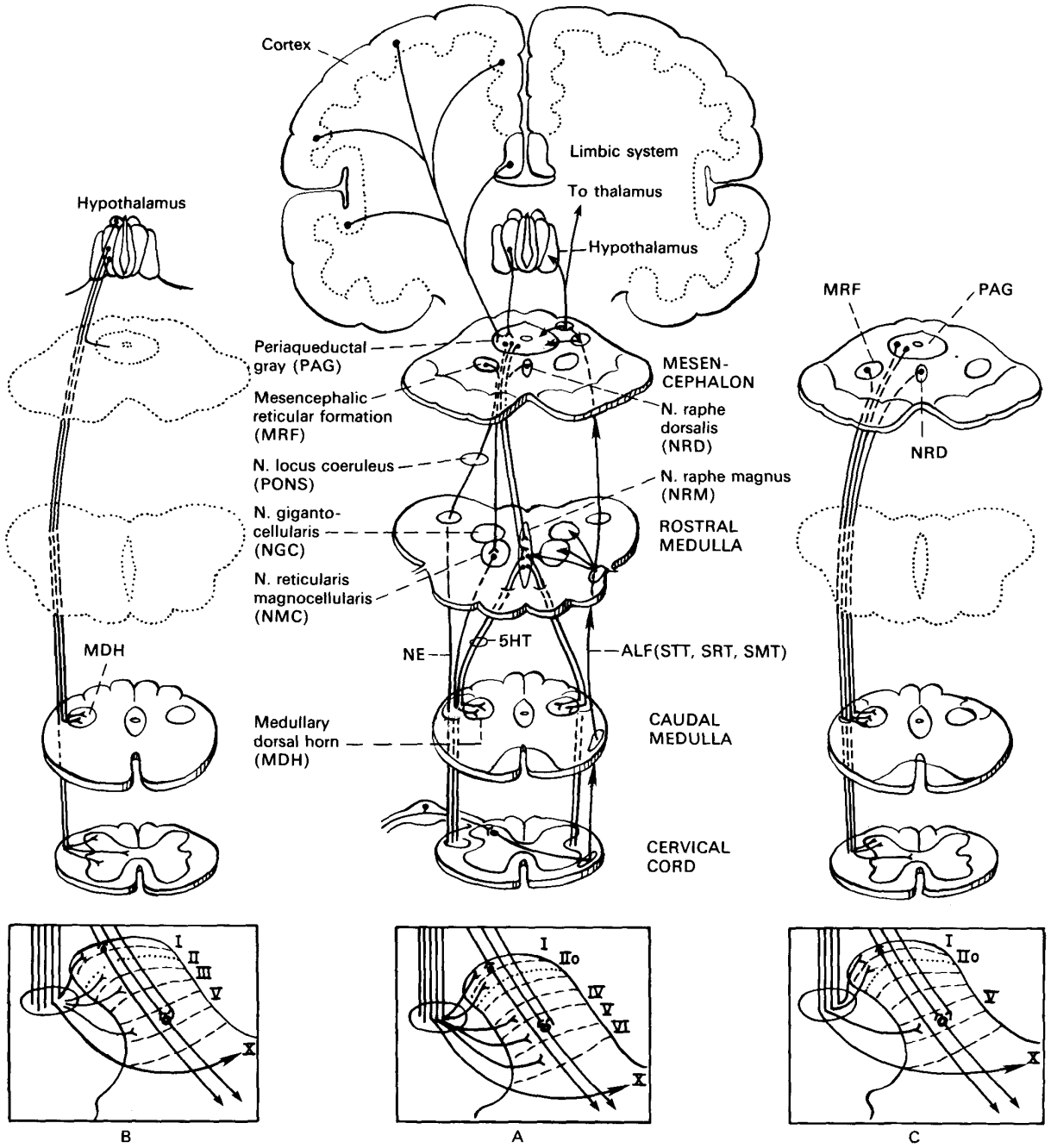
Kandel and Schwartz,
Principles of Neural Science

Ascending Spinothalamic Tract



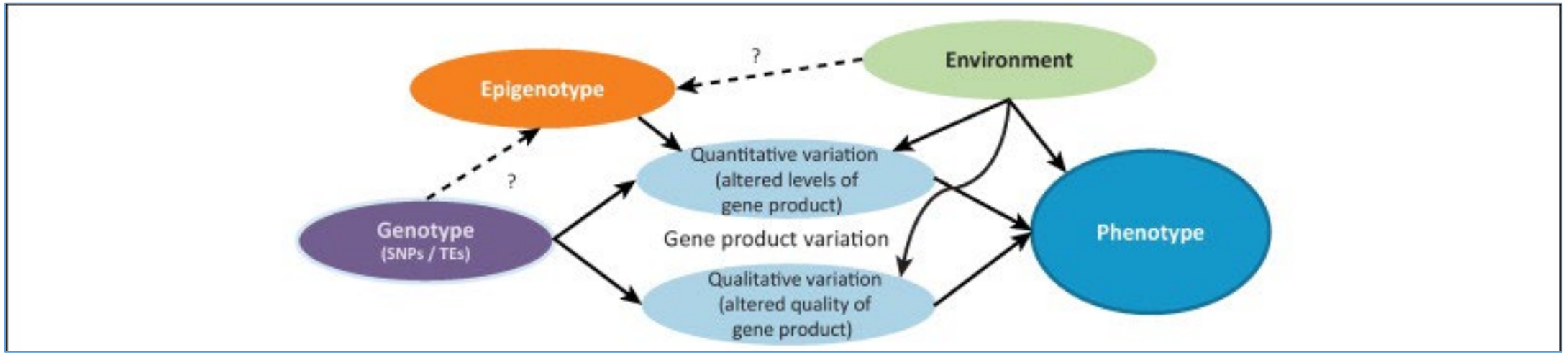
Kandel and Schwartz,
Principles of Neural Science

Descending Pain Modulation Pathways



Kandel and Schwartz,
Principles of Neural Science

Genotype, Epigenetics, and Phenotype



Springer, Trends in Genetics 29-4-2013

Methods of Functional Neuroscience

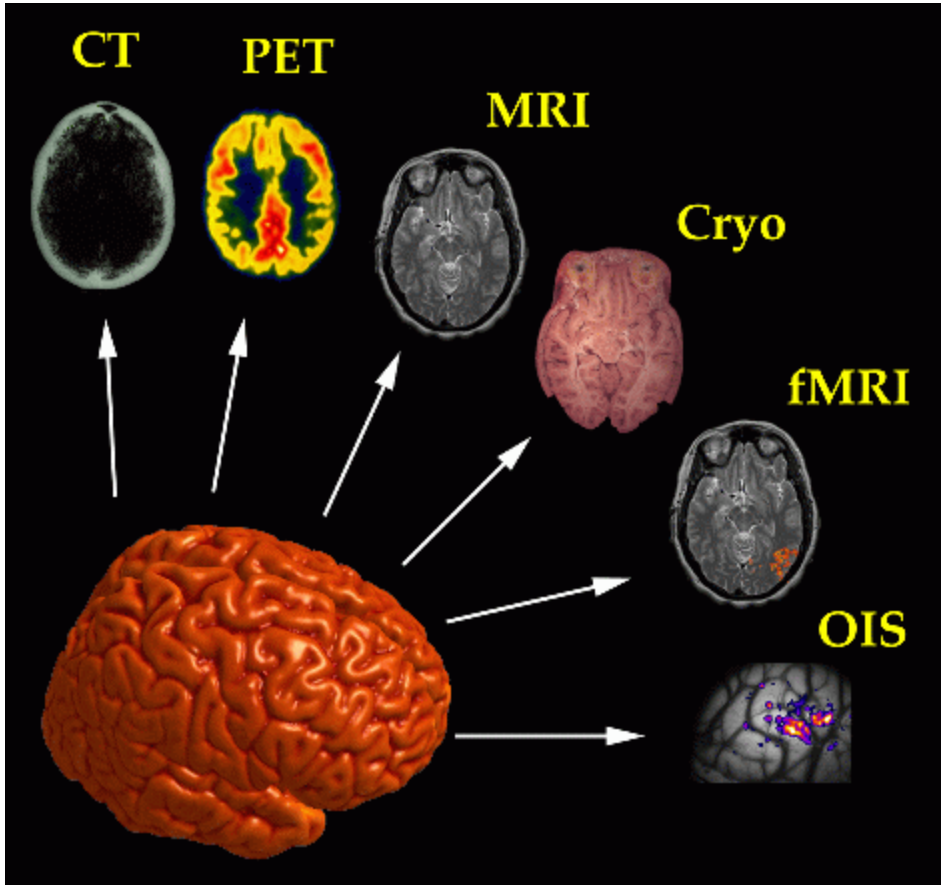
Neurobiology:
- *Neuroanatomy*
- *Neurophysiology*

Neuroimaging Techniques
- *PET/ SPECT*
- *MRI/fMRI*
- *EEG*
- *MEG*

Evidence from Dysfunction
- *Lesions*
- *Diseases of the CNS*

Patient Reported Outcomes

Computational Approaches



Brief Pain Inventory – Pain Intensity

1. Please rate your pain by circling the one number that best describes your pain at its worst in the last week.

0	1	2	3	4	5	6	7	8	9	10
No Pain										Pain as bad as you can imagine

Worst

2. Please rate our pain by circling the one number that best describes your pain at its least in the last week.

0	1	2	3	4	5	6	7	8	9	10
No Pain										Pain as bad as you can imagine

Least

3. Please rate our pain by circling the one number that best describes your pain on the average in the last week.

0	1	2	3	4	5	6	7	8	9	10
No Pain										Pain as bad as you can imagine

Average

4. Please rate our pain by circling the one number that tells how much pain you have right now.

0	1	2	3	4	5	6	7	8	9	10
No Pain										Pain as bad as you can imagine

Right Now

Charles Cleeland 1984

Brief Pain Inventory

Pain Interference Scale

5. General Activity

0	1	2	3	4	5	6	7	8	9	10
Does not Interfere										Completely interferes

6. Mood

0	1	2	3	4	5	6	7	8	9	10
Does not Interfere										Completely interferes

7. Walking Ability

0	1	2	3	4	5	6	7	8	9	10
Does not Interfere										Completely interferes

8. Normal work (includes both work outside the home and housework)

0	1	2	3	4	5	6	7	8	9	10
Does not Interfere										Completely interferes

9. Relations with other people

0	1	2	3	4	5	6	7	8	9	10
Does not Interfere										Completely interferes

10. Sleep

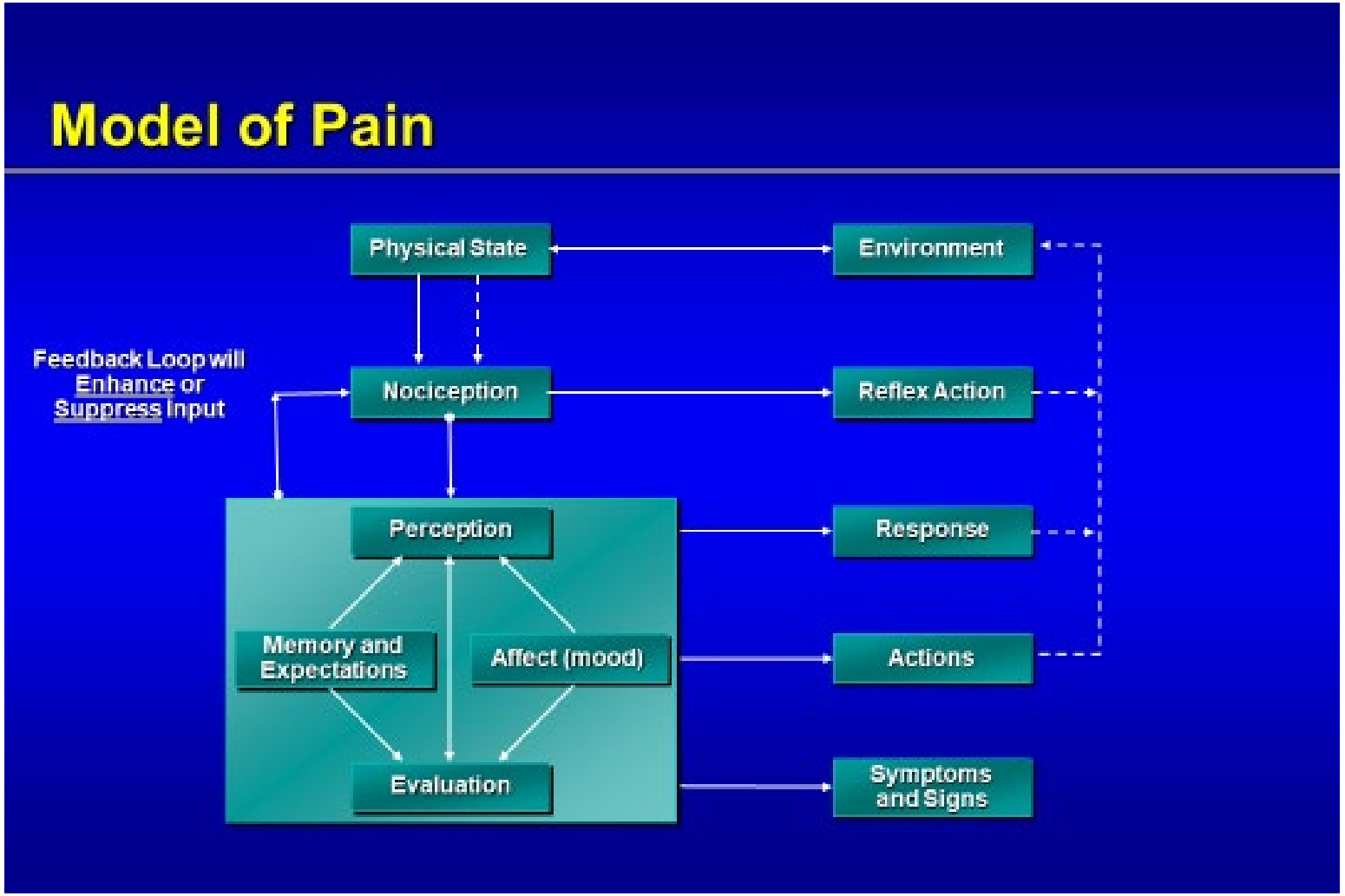
0	1	2	3	4	5	6	7	8	9	10
Does not Interfere										Completely interferes

11. Enjoyment of life

0	1	2	3	4	5	6	7	8	9	10
Does not Interfere										Completely interferes

Charles Cleeland 1984

Practical Model of the Nervous System Function



Definition of Pain

The unpleasant

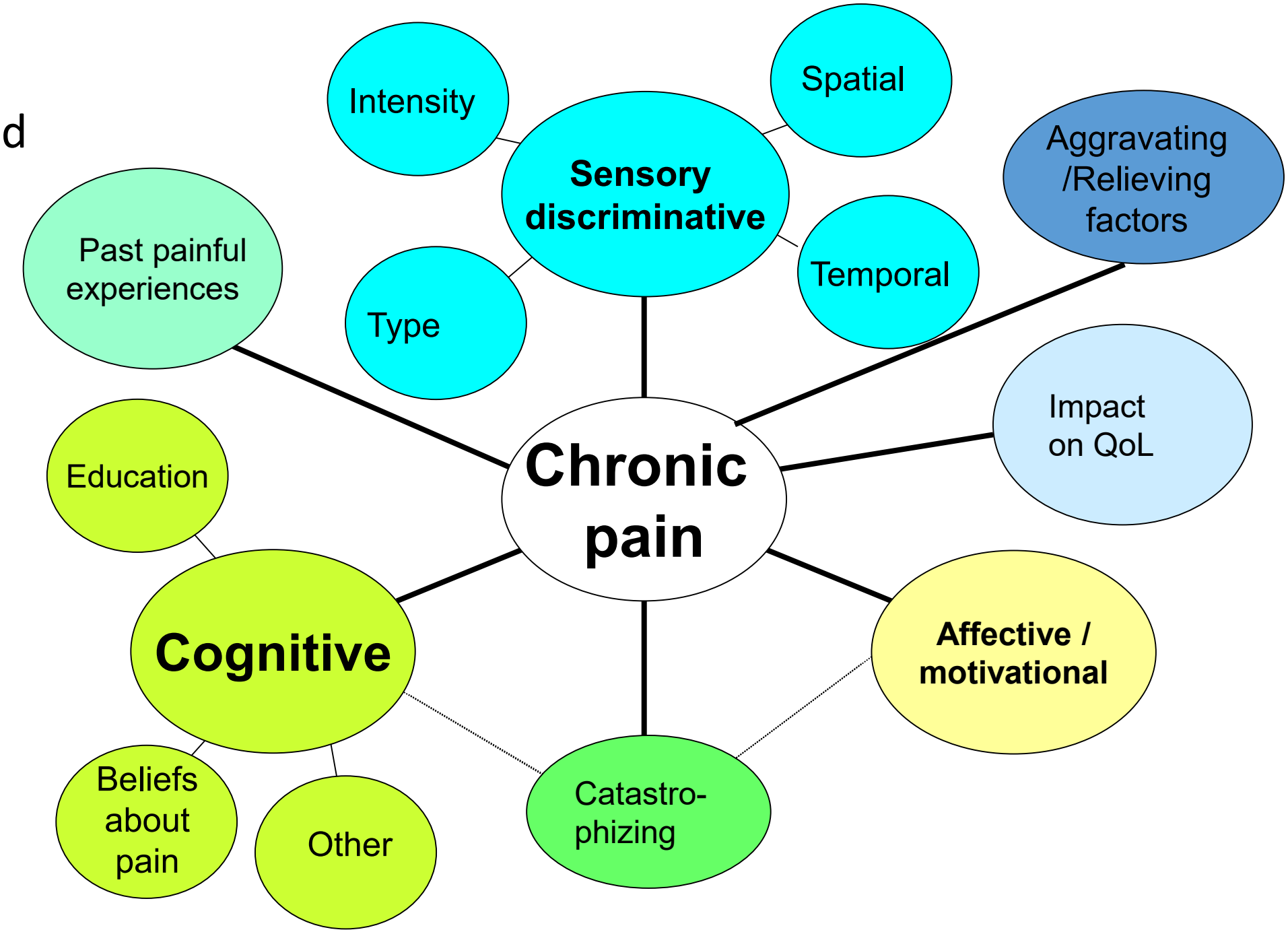
sensory and emotional experience

of actual or potential tissue damage or

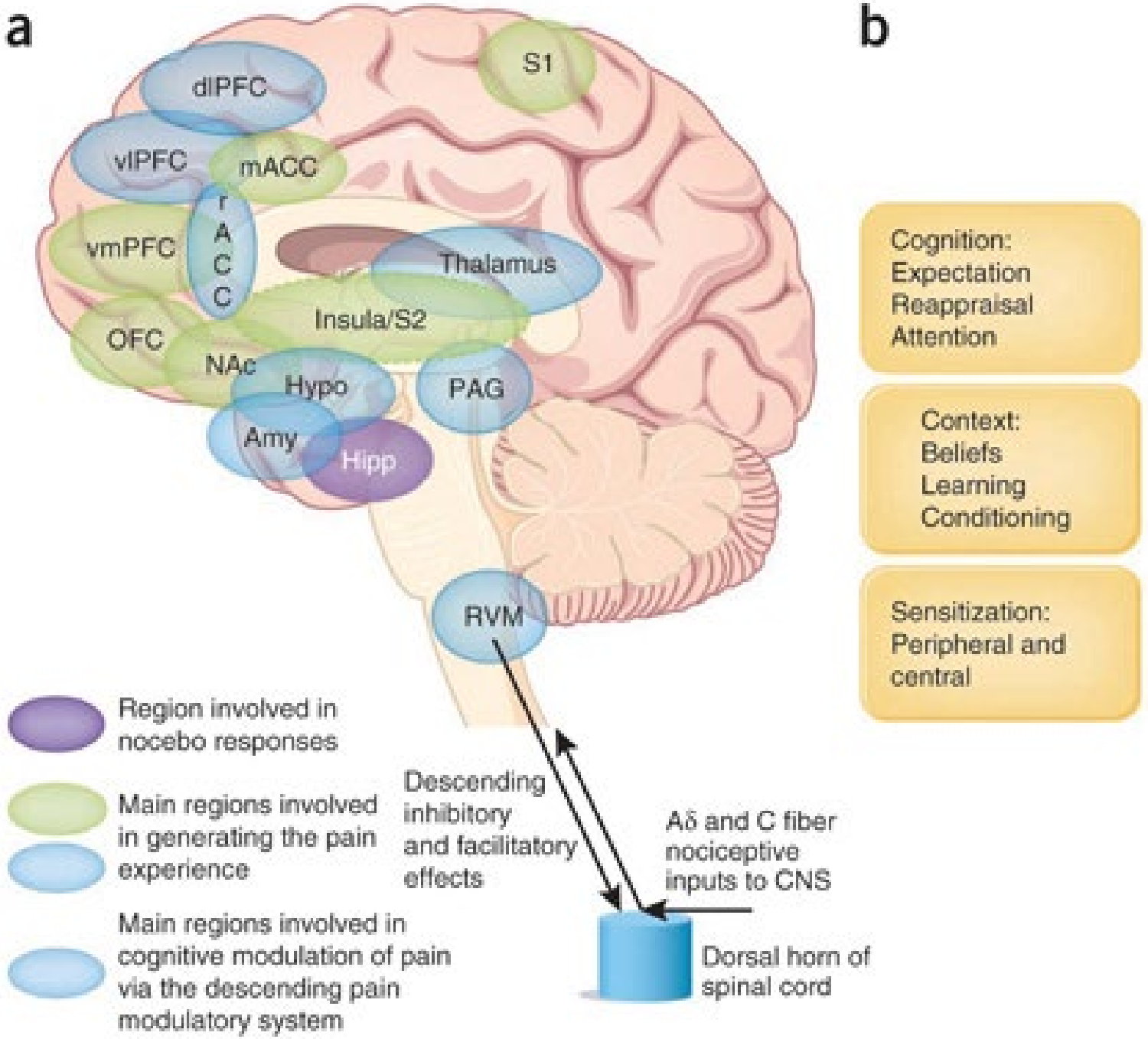
an experience expressed in such terms.

Merskey H, Pain Taxonomy, International Association for the Study of Pain, 1996.

Processes Involved in Pain and Pain Perception



Tracey I
Nature Medicine –
Focus on Pain V16,N11
p45 2010



History of Pain – Simplistic View

- Pain is a subjective phenomenon
- Societies view of pain
  - No pain no gain
  - Grin and bare it
  - Cut out the painful process
- Pain without a lesion – “Not real”
  - Phantom limb pain
  - Healed surgical wound with ongoing pain
  - Chronic regional pain syndromes
- Functional imaging – game changer
  - Ended the debate that pain is “real”
  - Still not able to provide the severity of pain experience

Issues in Biopsychosocial Model

- George Engel helped elucidated the relationship of the mind and brain
- Psychological vs physiological
  - Seeing a possible sources of pain does not mean that is what hurts
  - Different people respond differently to the same stimulus
  - Pain (perception) is all in the head – imaging implies that the answer is yes
- But it is not only about what the patient thinks
  - More than about what patient feels or how they interpret their symptoms
  - Care-givers need to know that detailed explanations can help but also can hurt
  - Patients need to learn to live with the pain, not be controlled by seeking a cure
- Even if we knew every connection in the brain could not explain how it works

Advantages of Biopsychosocial Model

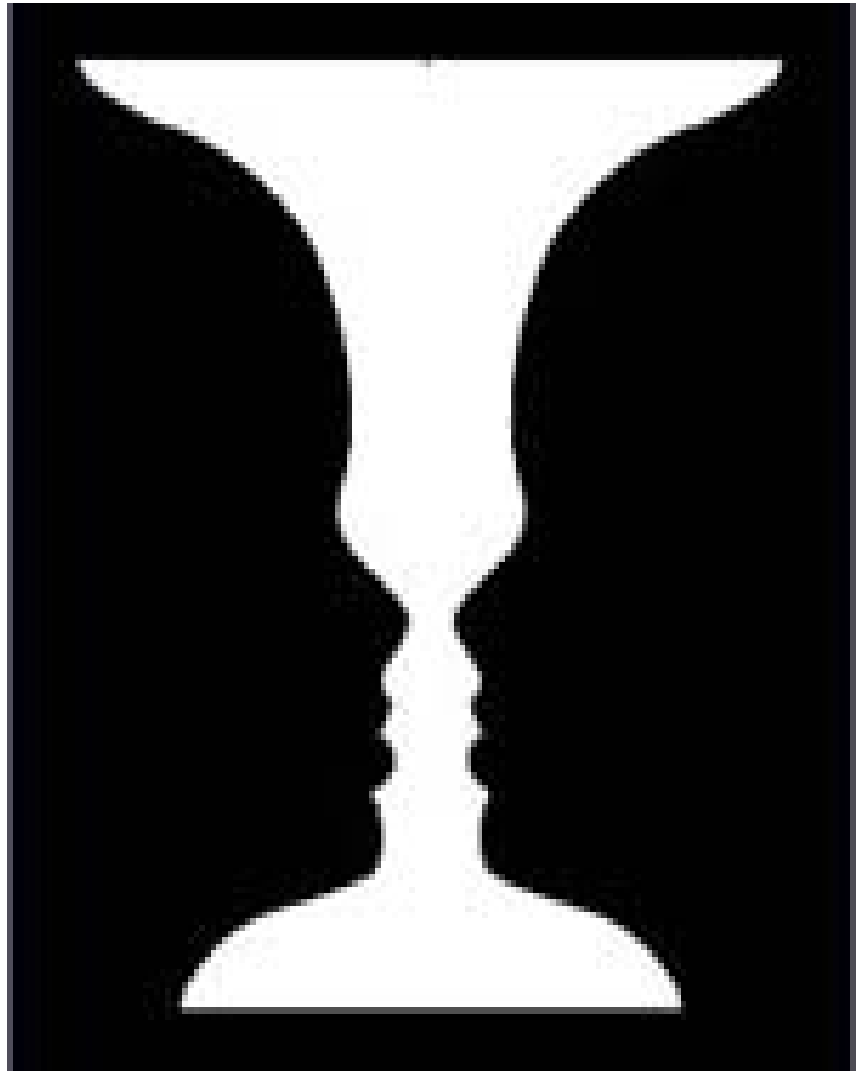
- Biopsychosocial clinical reasoning – figure out what is most important to the patient
- Multimodal approaches to the treatment of pain
- Multidisciplinary pain care adapted to specific populations
- Roles of psychosocial, socioeconomic, ethnicity, and gender factors can be as important as the underlying physiological components
- Cultural competence and cross-cultural factors
- Managing stress and gaining control of their lives
- Understanding the illness experience
- Communicating health information to patients and their families
- Facilitating motivation/behavioral change/movement
- Taking a modern approach to the culture of health-care

Biopsychosocial Approach - Learning to Live in Pain

- Validate our patient's struggles with compassion
- Patients must understand and be involved in their own treatment
- Pain care is a collaboration between healthcare and patients – providing patients with a sense of self-control over their pain is a key feature
- Help patients set realistic expectations
- Transition patients from negative to positive thoughts – pain catastrophizing versus coping strategies
  - Change behaviors to pain to control perception and response
    - Negative (Catastrophizing) - Helplessness and a preoccupation with the negative consequences
    - Positive (Coping skills) - Relaxation exercises, distraction, and positive self-statements
  - Coping skills
    - Helps patients to take control of their pain
    - Rebuild self-efficacy and confidence, and allows them to get on with their lives
- Treat the whole patient, not just the symptoms or the pathology

Changing the State of the Brain

What do you see?



Thank you!

Useful Reference:

Meints SM, Edwards RR. Evaluating psychosocial contributions to chronic pain outcomes. *Prog Neuropsychopharmacol Biol Psychiatry*. 2018;87(Pt B):168-182. doi:10.1016/j.pnpbp.2018.01.017