Elicitation of affect

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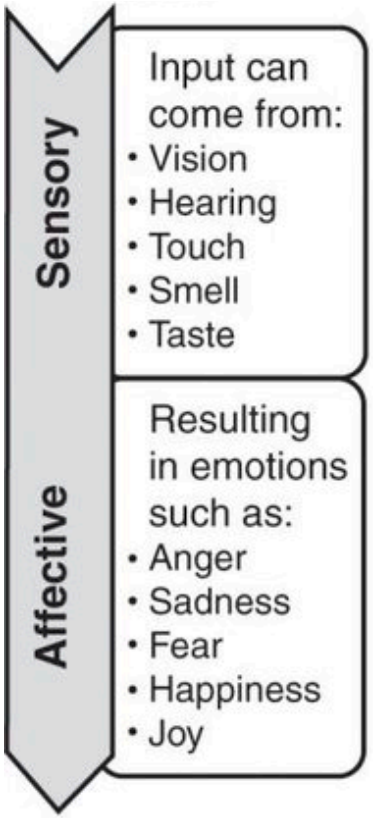
University of Alabama
PY 630 – Affective Neuroscience
Spring 2022

Don’t forget to record!

How can we elicit feelings?

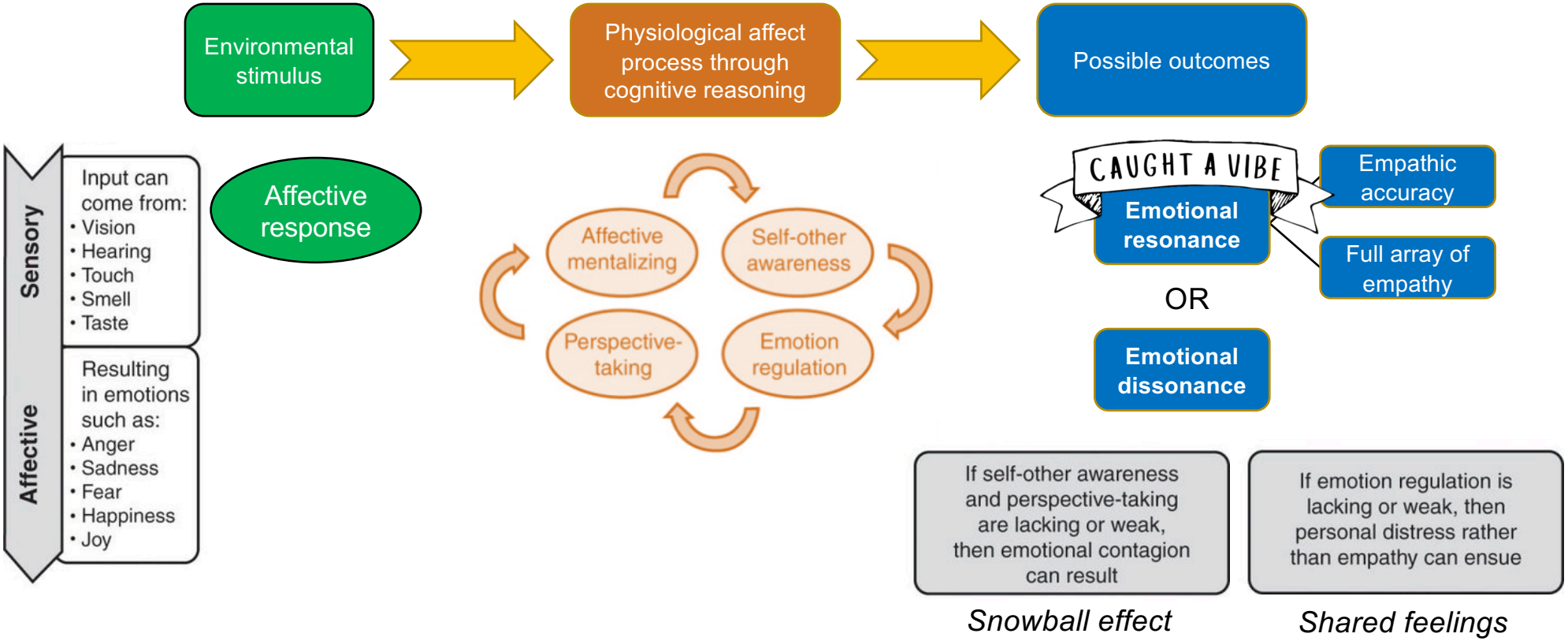


Sense	Anger	Sadness	Fear	Joy
Vision				
Hearing				
Touch				
Smell				
Taste				

Overview

- Pain: “social pain” / empathy
- Elicitation of affect by music

Elicitation of emotion

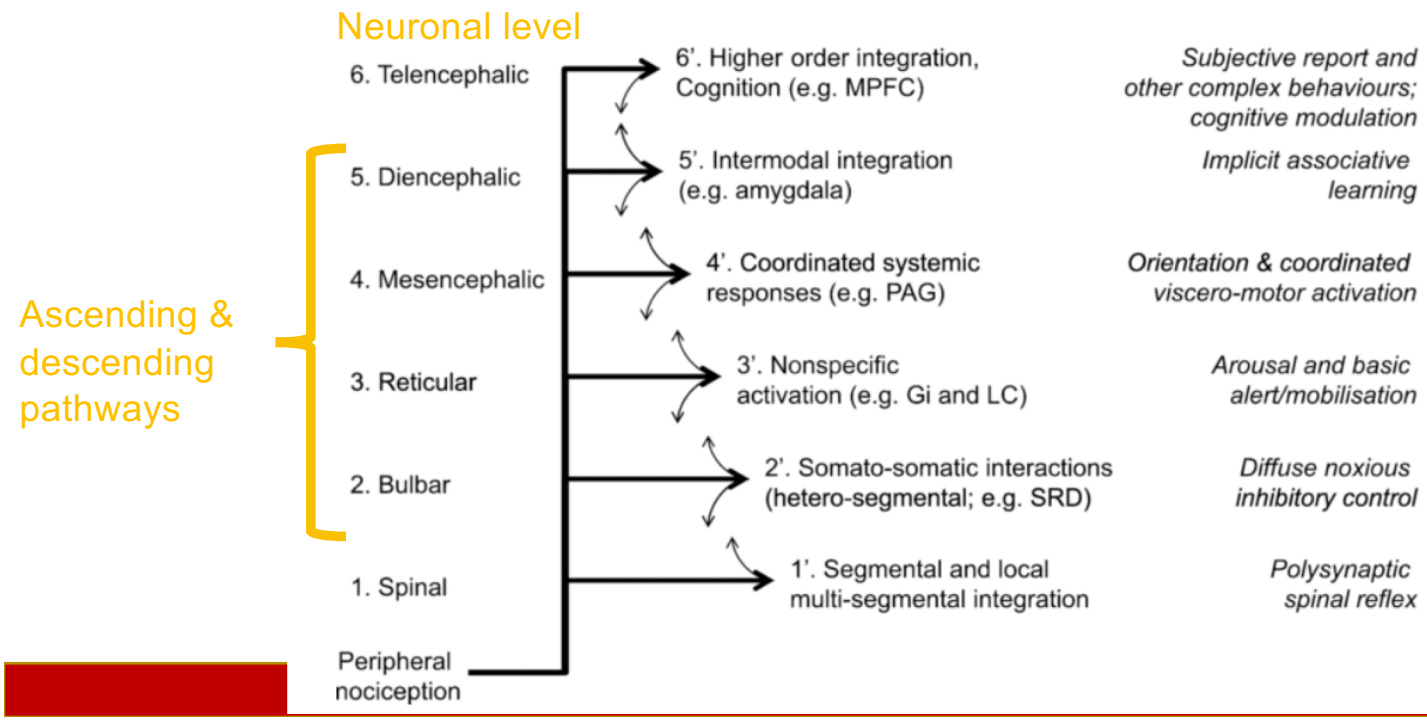


Is pain an emotion?

- If emotion requires… then is pain an emotion?
  - Trigger (e.g., event, object, mental process)
  - Self-evaluation (conscious or unconscious)
  - Response (motor, behavioral, expressive)
- Some differences:
  - Pain requires a "*bodily sensation with qualities like those reported during tissue damaging stimulation*"
  - Pain → emotion inducer?

Hierarchical organization of nociceptive sys

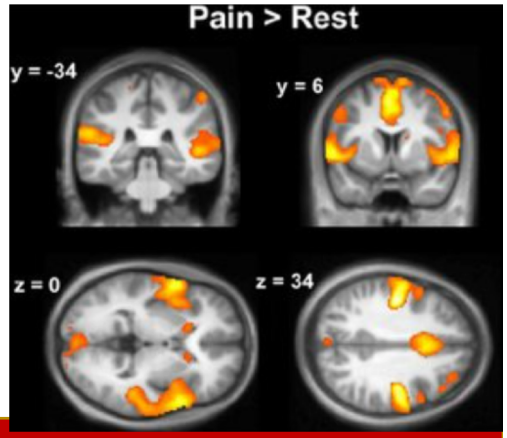
- **Nociception**: Perception or sensation of pain
- Exists at multiple levels of ANS



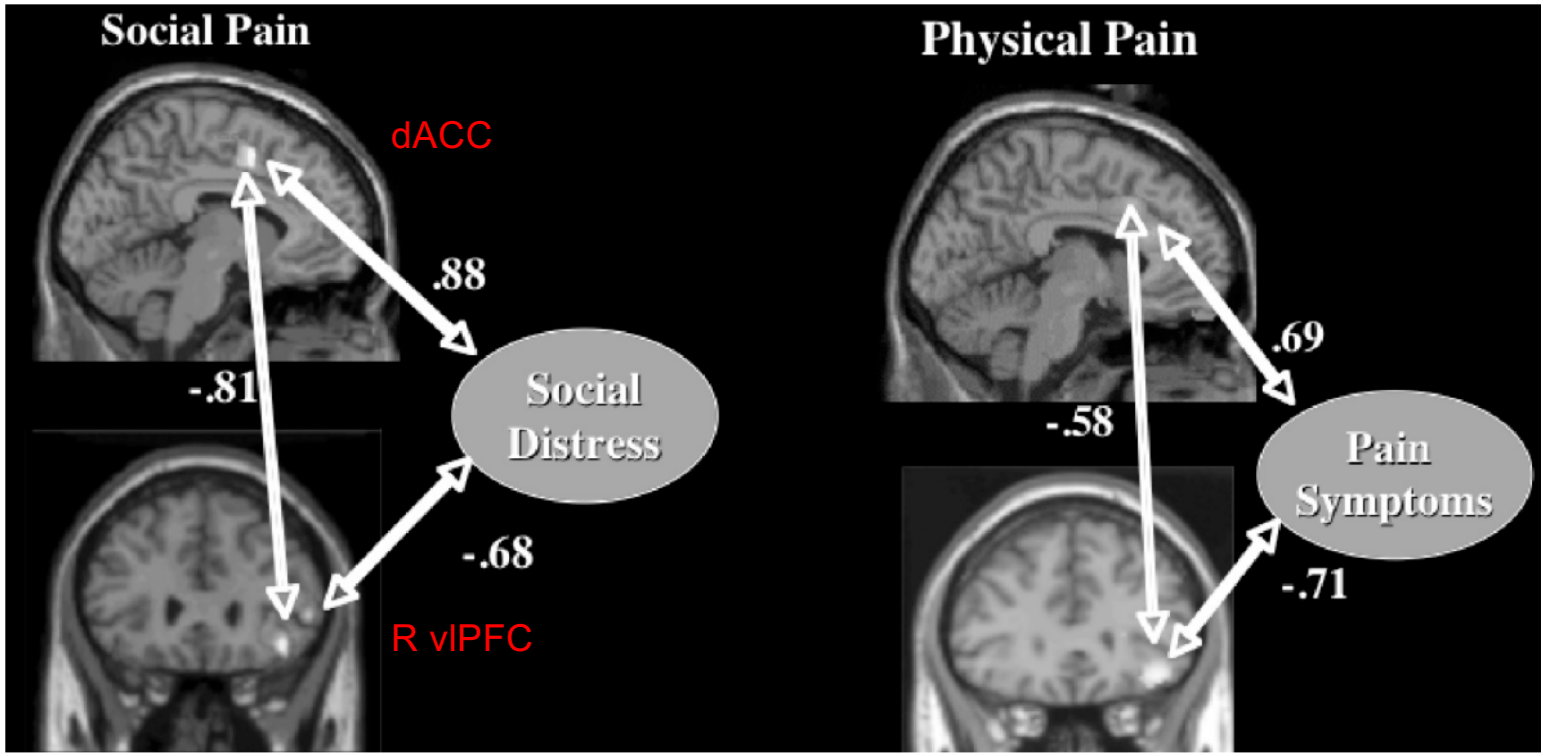
fMRI also indicates:

ACC, somatosensory cortex (SI, SII)

Insula, basal ganglia, thalamus

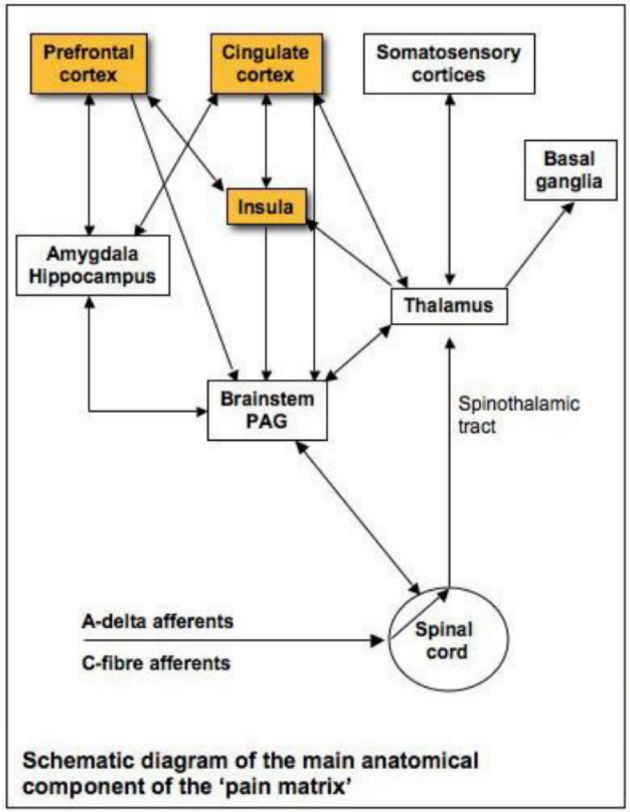


Social pain

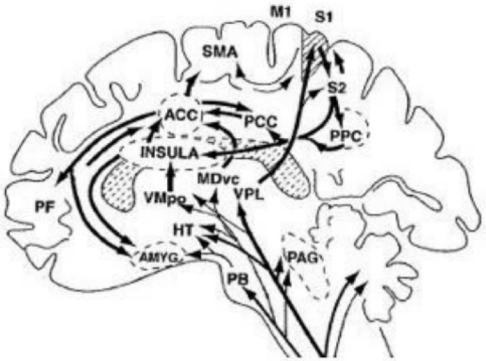


Lieberman & Eisenberger

Social pain brain network



Schematic diagram of the main anatomical component of the 'pain matrix'

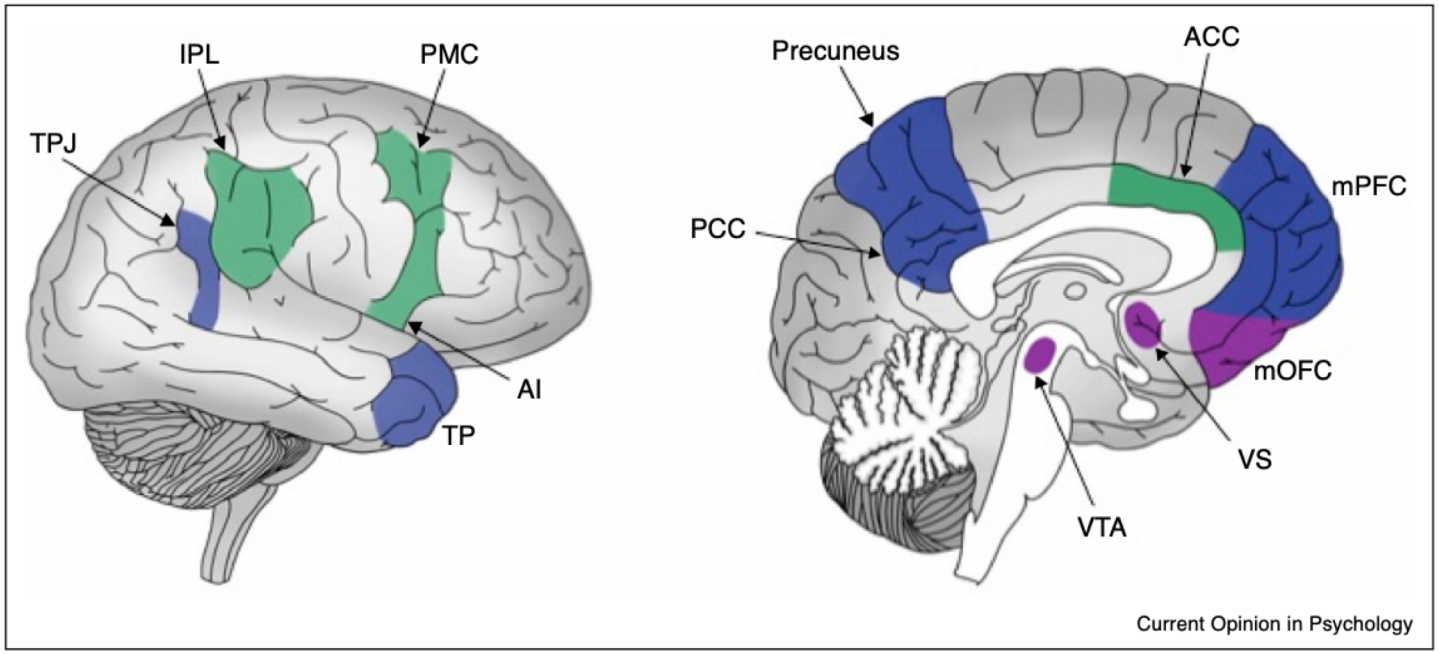


➡ **The primary (SI) and secondary (SII) sensory cortices** are involved in the sensory-discriminative aspects of pain, e.g., the bodily location and intensity of the stimulus.

➡ **ACC and insula** subserve the affective-motivational component, i.e., the evaluation of subjective discomfort and response preparation in the context of painful or aversive stimuli.

Decety, J., & Lamm, C. (2009). Empathy vs. personal distress. In The Social Neuroscience of Empathy

Empathy and the brain



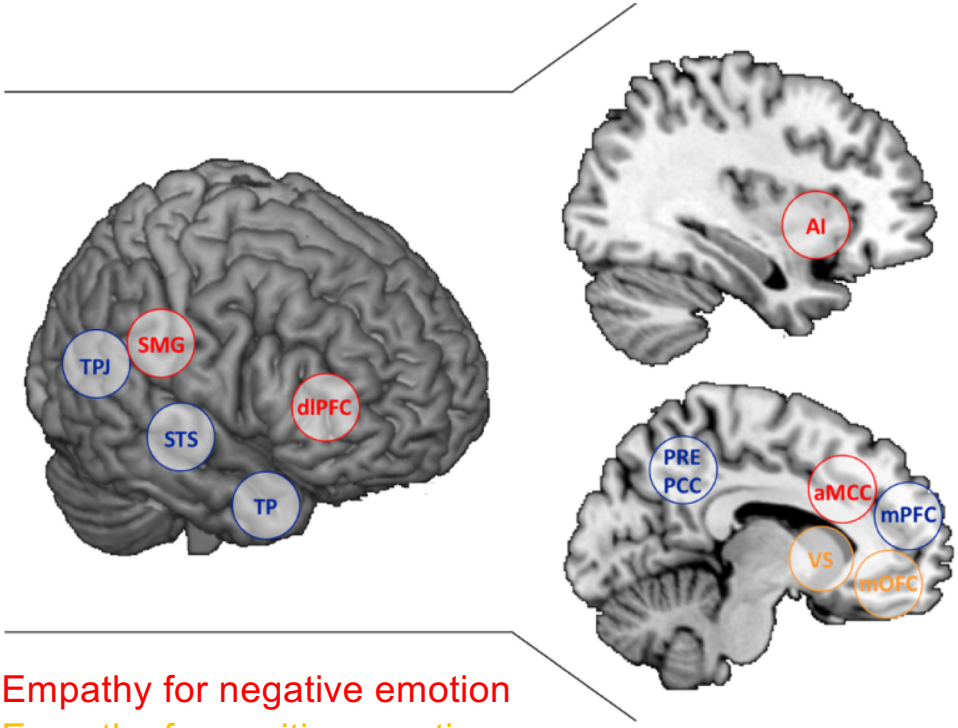
Brain areas asssociated with experience sharing (green), mentalizing (blue), and empathic concern (purple). *Abbreviations*: TPJ, temporoparietal junction; IPL, inferior parietal lobule; PMC, premotor cortex; TP, temporal pole; AI, anterior insula; PMC, premotor cortex; PPC, posterior cingulate cortex; ACC, anterior cingulate cortex; MPFC, medial prefrontal cortex; mOFC, medial orbitofrontal cortex; VS, ventral striatum; VTA, ventral tegmental area.

Weisz & Zaki, 2018

But empathy vs. perspective-taking?

TABLE 1 | Summary of the conceptual and empirical dissociation of empathy and perspective-taking.

Empathy	Perspective-taking
• Affective process	• Cognitive process
• Sharing another's emotional state	• Taking another's perspective
• Awareness that other is source of emotion	• Abstract representation of others' mental state
• Involved brain regions depend on emotional valence, largely overlaps with salience network	• Widespread network for information processing, core nodes overlap with default mode network
• Develops ontogenetically early, does not decline in old age	• Later ontogenetic development, declines in old age
• State/trait reductions mainly for motivational/habitual reasons	• State/trait reductions for motivational/habitual and cognitive reasons



Empathy for negative emotion
Empathy for positive emotion
Theory of mind

Stietz et al., 2019

Cyberball paradigm

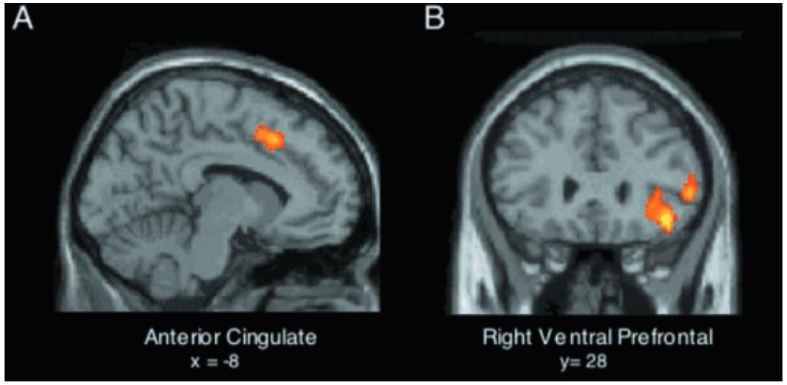
- Affective response to social exclusion
  - Periods of engagement
  - Periods of exclusion

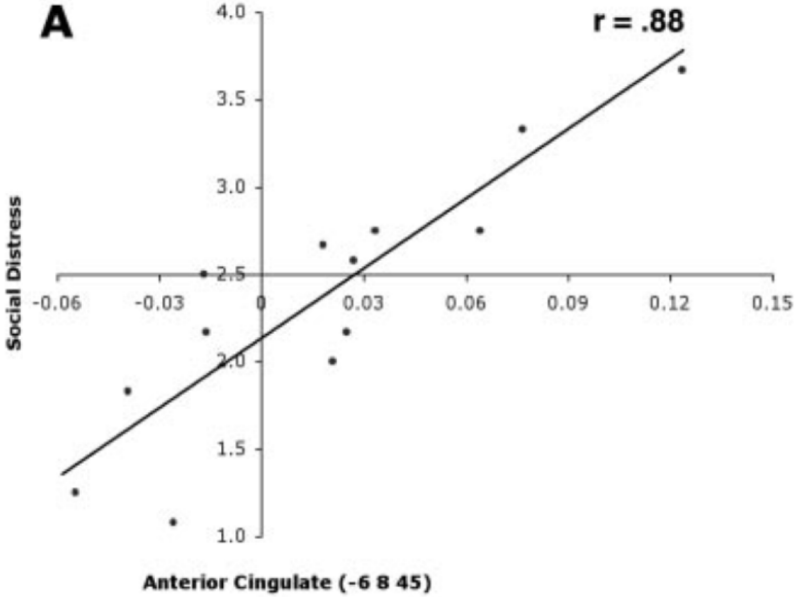
Kipling Williams talking about inspiration for task: https://www.youtube.com/watch?v=A3UTXsJzAj4

https://www.youtube.com/watch?v=OwQ_VyOUGmY

Cyberball paradigm – fMRI findings

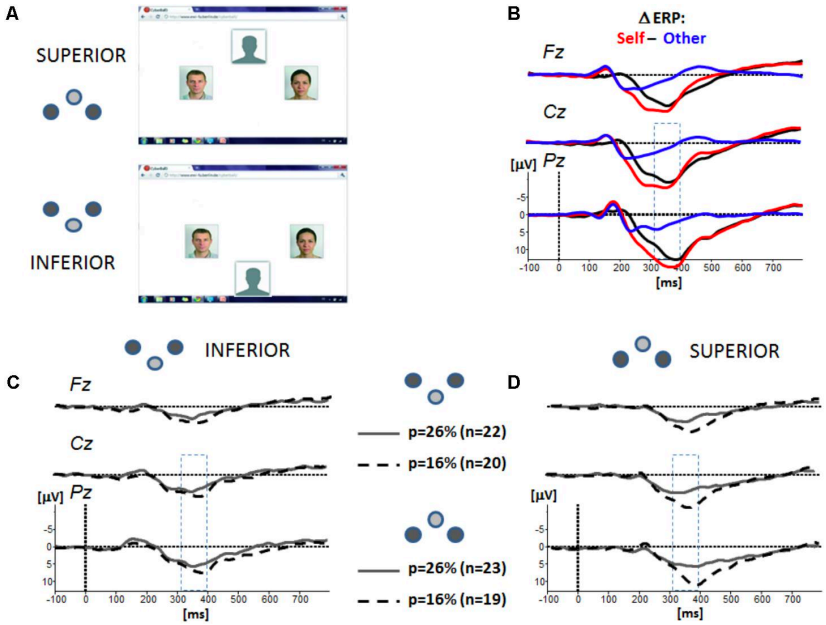
Eisenberger et al., 2003



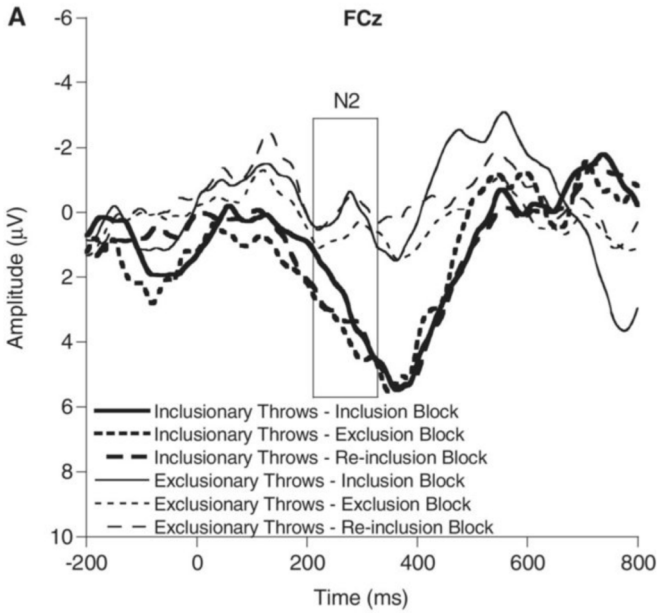


Cyberball paradigm – ERP findings

Schuck et al., 2018



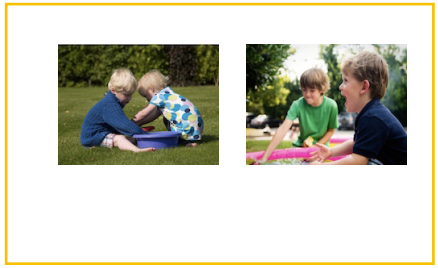
Themanson et al., 2012

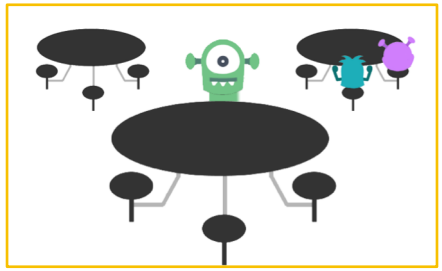


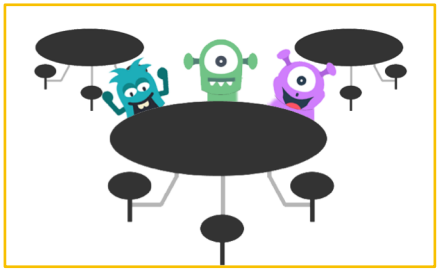
Cyberball challenges

- Not ecologically valid – most people figure out that it is experimentally manipulated
- Inclusion is confounded by engagement

  → Hudac, 2019 tried to address by creating the new Lunchroom paradigm







Elicitation of emotions by music

Advantages of AffNeuro

- Evocative
- Range of emotions
- Production & listening
- Social activity
- Can link in time

Challenges for AffNeuro

- Musical preferences are varied
- Difficult to control for familiarity
- Controlling music across conditions

Models and models of music

P.N. Juslin / Physics of Life Reviews 10 (2013) 235–266

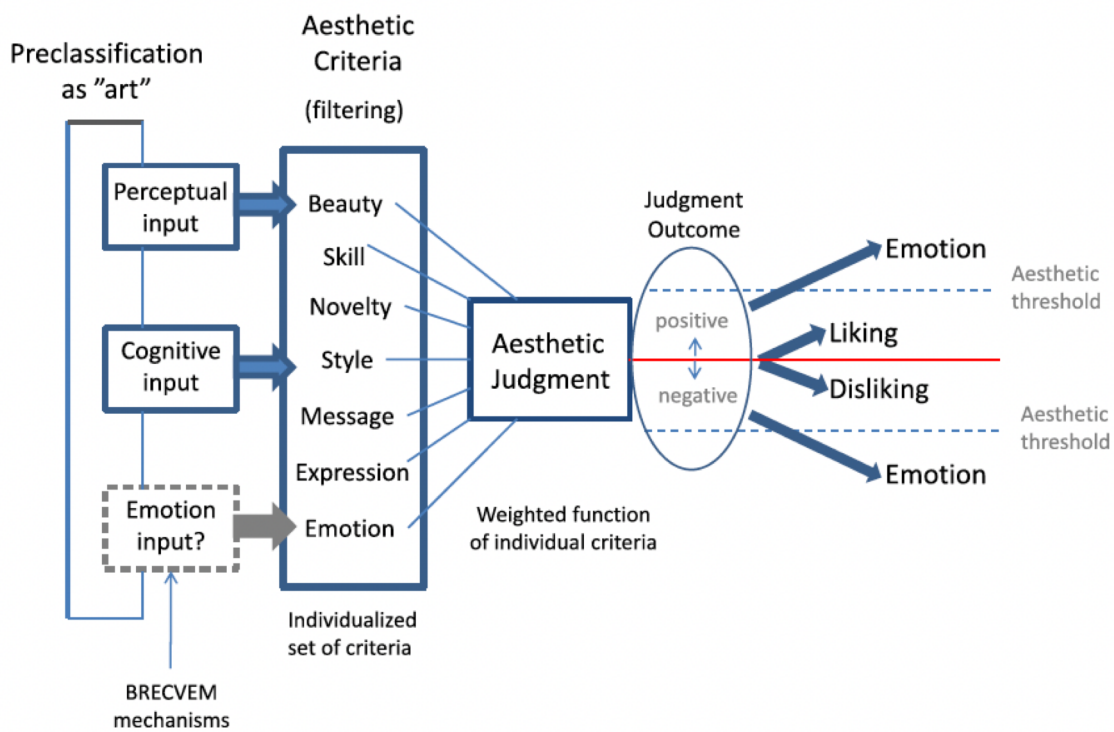
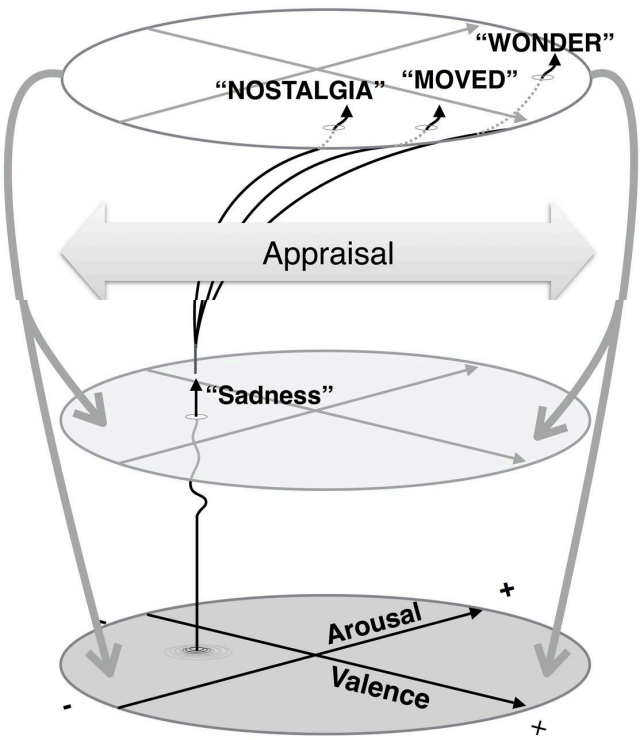


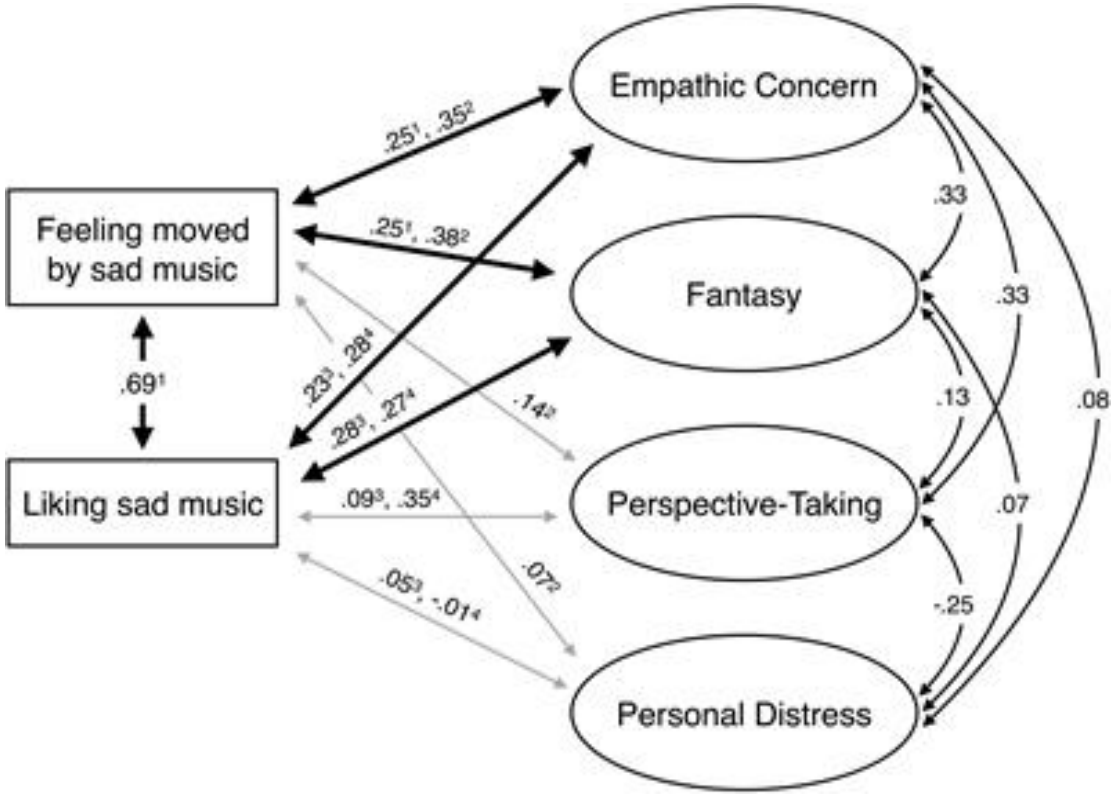
Fig. 1. Schematic description of the aesthetic judgment process in music listening.

Models and models of music

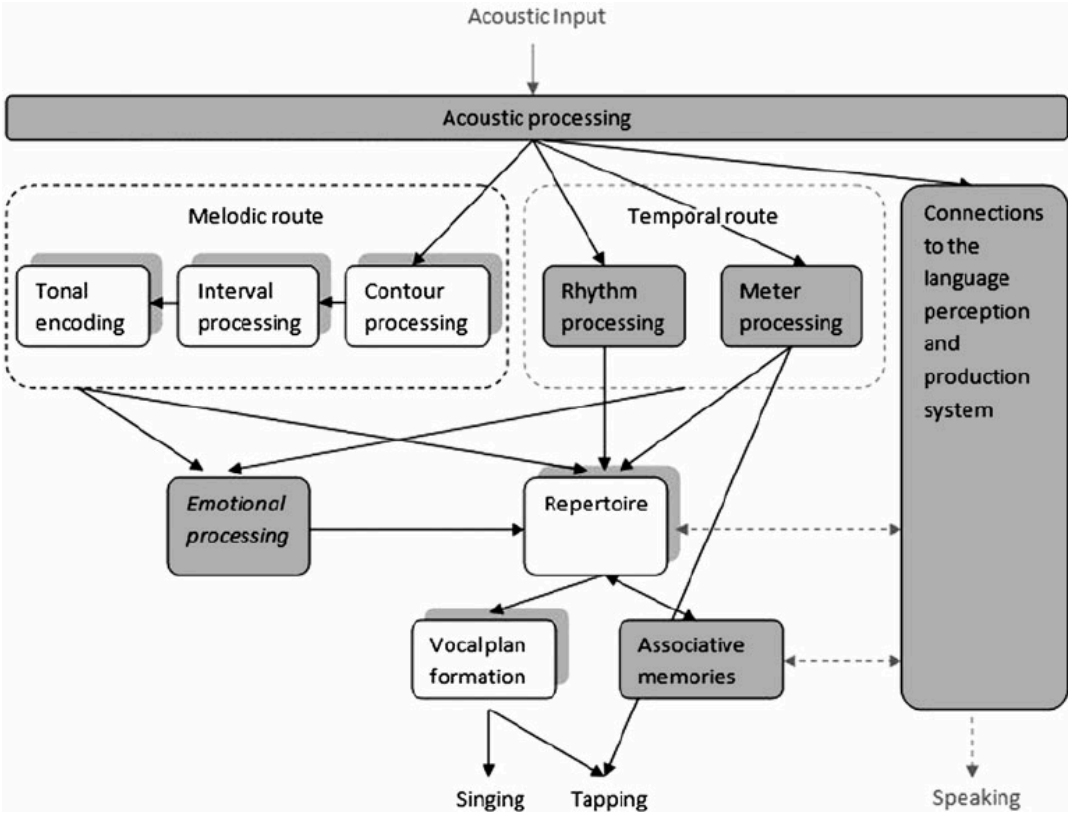


Emotion Models	Levels of explanation	Types of measures
Aesthetic	Enriched experience	Narratives, metaphors
Basic	Recognition	Self-reports
Dimensional	Core Affect	Autonomic and endocrine system

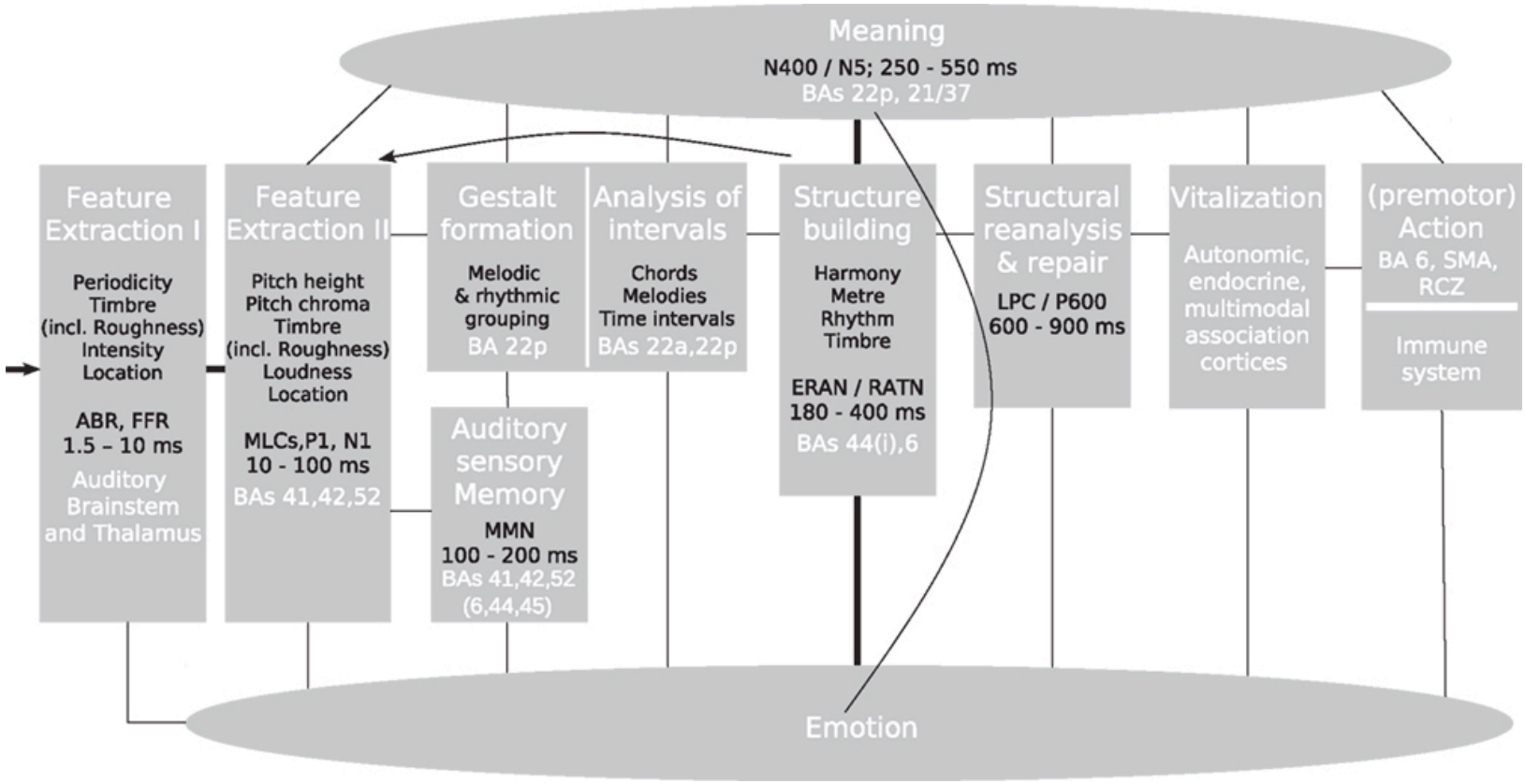
Models and models of music



Models and models of music

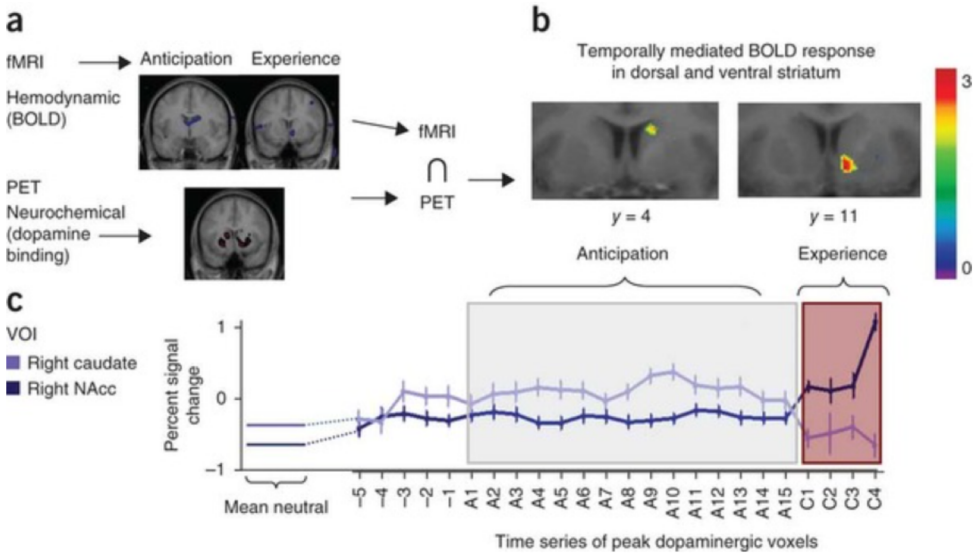


Models and models of music



Neuroscience of music – chemical link

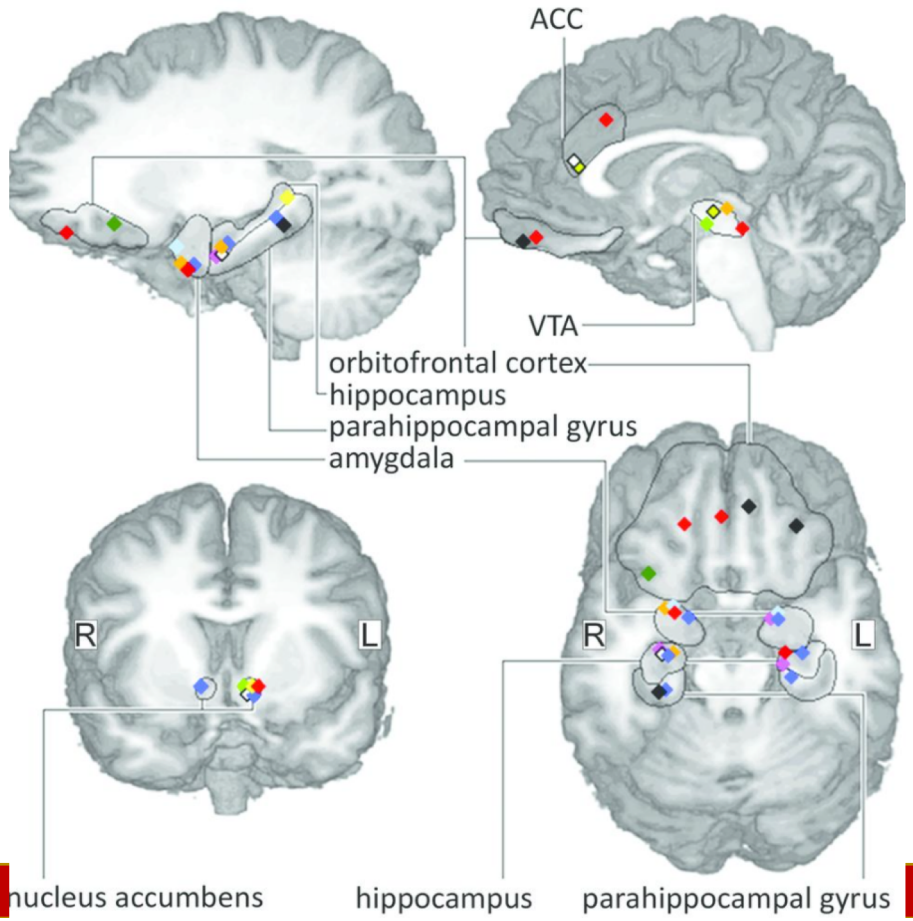
- Music → dopamine in dorsal and ventral striatum
- Network of brain regions supporting auditory processing



Salimpoor et al., 2011: "chills"
https://www.nature.com/articles/nn.2726

https://www.wired.com/2011/01/the-neuroscience-of-music/

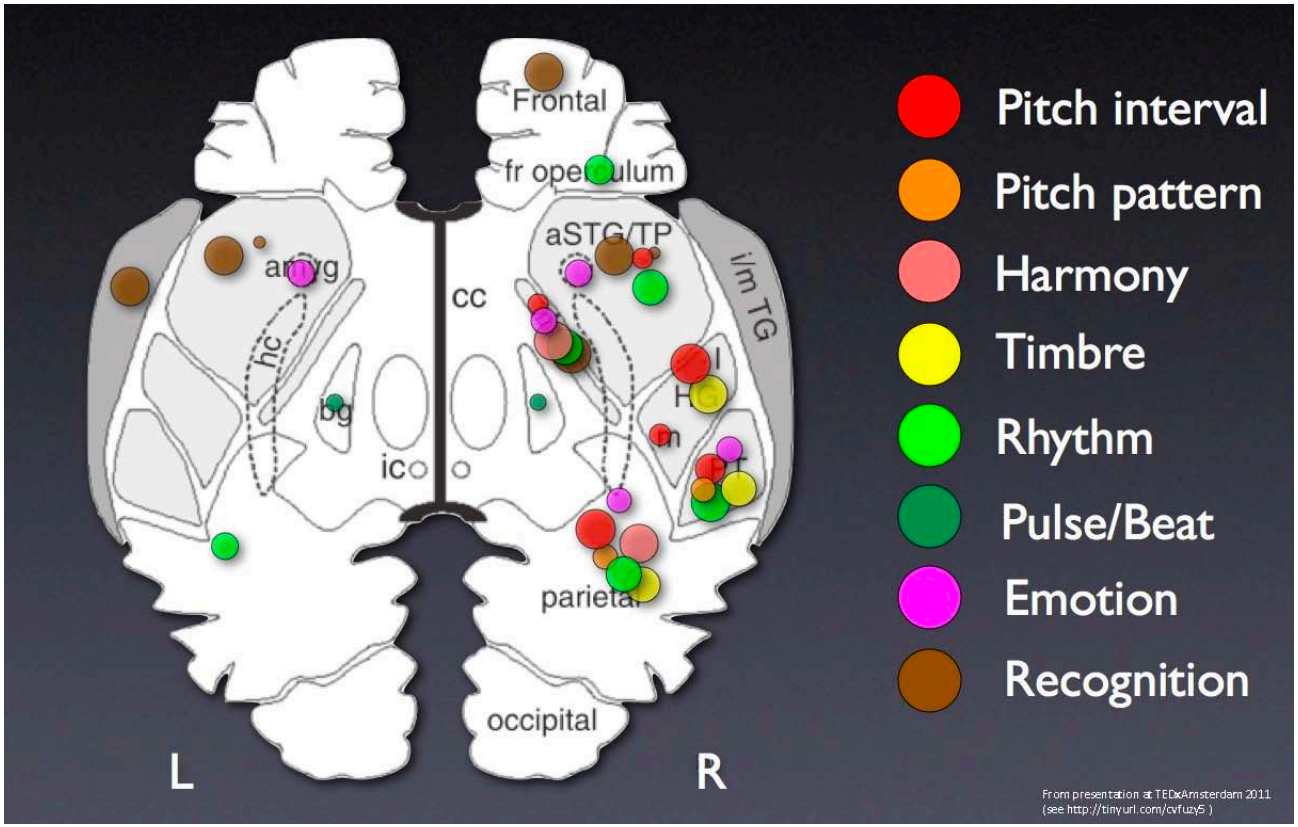
Limbic and paralimbic networks



- Increase music "chill"
  - AMY
  - Hippocampus
  - Ventral striatum
  - Anterior insula
  - ACC
  - OFC

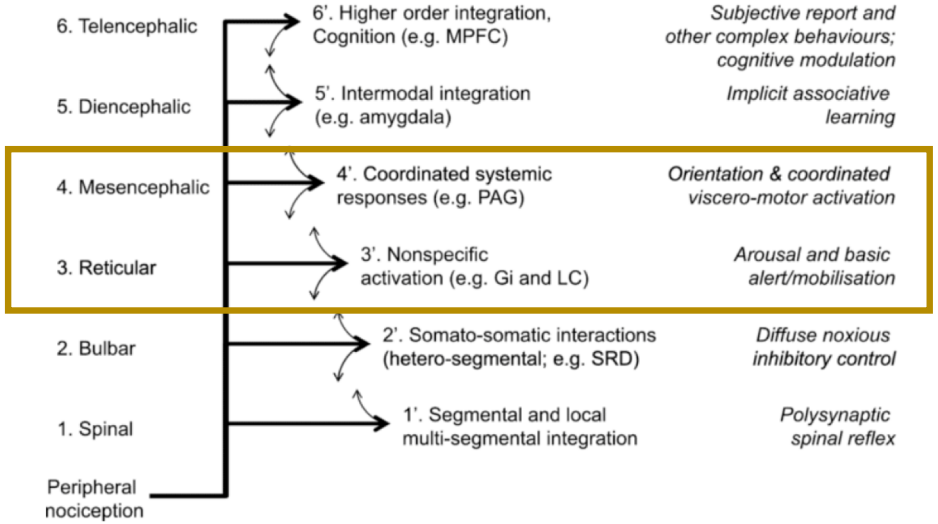
Even without "chill"

Neuroscience of music – neural “hubs”



Outstanding questions

- How are mixed emotions expressed?
  - *Pleasant sadness*
  - *Fascinating fear*
- Interactions with memory (hippocampus) and cognitive control (ACC)
  - True role of sensory gating in perception (or production?) of music



Wednesday's readings for discussion

- **Discussants:** Allison & Kate
- Reading 1: Olié, E., Husky, M., Le Bars, E., Deverdun, J., de Champfleur, N. M., Crespo, A. A., ... & Courtet, P. (2021). Prefrontal activity during experimental ostracism and daily psychache in suicide attempters. *Journal of affective disorders*, *285*, 63-68.
- Reading 2: Mischkowski, D., Palacios-Barrios, E. E., Banker, L., Dildine, T. C., & Atlas, L. Y. (2018). Pain or nociception? Subjective experience mediates the effects of acute noxious heat on autonomic responses. *Pain*, *159*(4), 699.