Class 02: Theory

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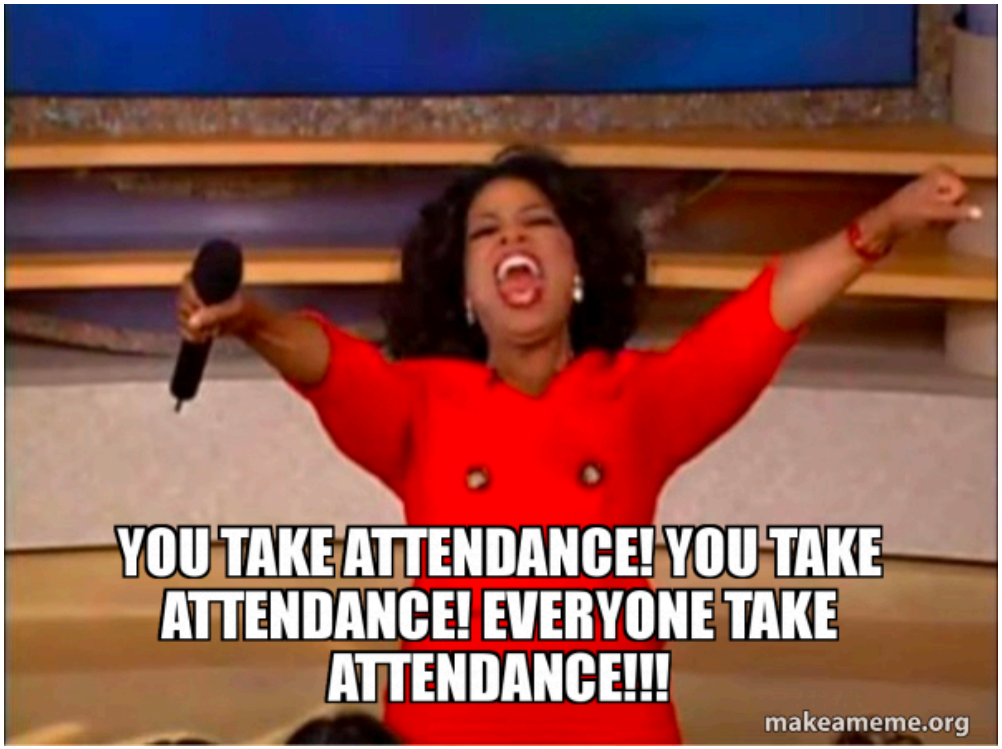
University of Alabama

PY 630 – Affective Neuroscience
Spring 2022

Overview

- Remaining introductions
- Conceptual differences in emotion, affect, mood

Attendance

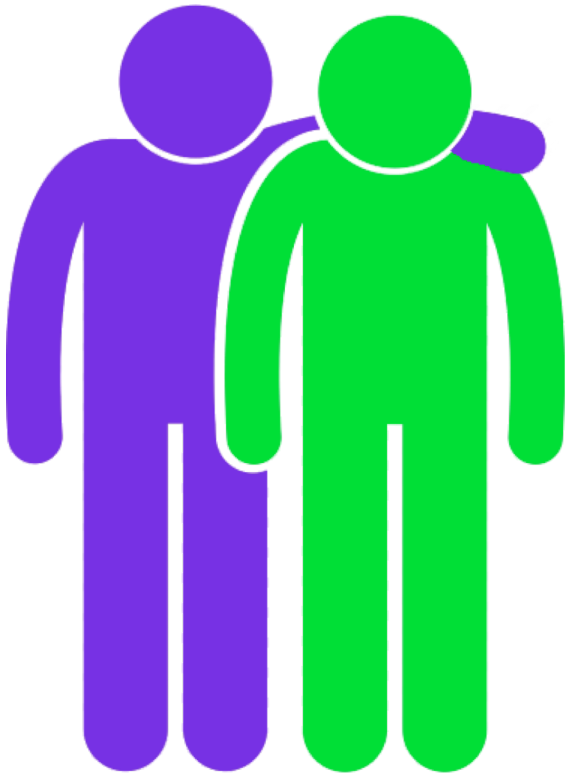

YOU TAKE ATTENDANCE! YOU TAKE ATTENDANCE! EVERYONE TAKE ATTENDANCE!!!
makeameme.org

Record

Introductions

1. Preferred name
2. Pronouns
3. Year in X program
4. Advisor
5. Professional and/or research interests
6. Reason for taking class
7. Goal/s for semester

Conceptual differences

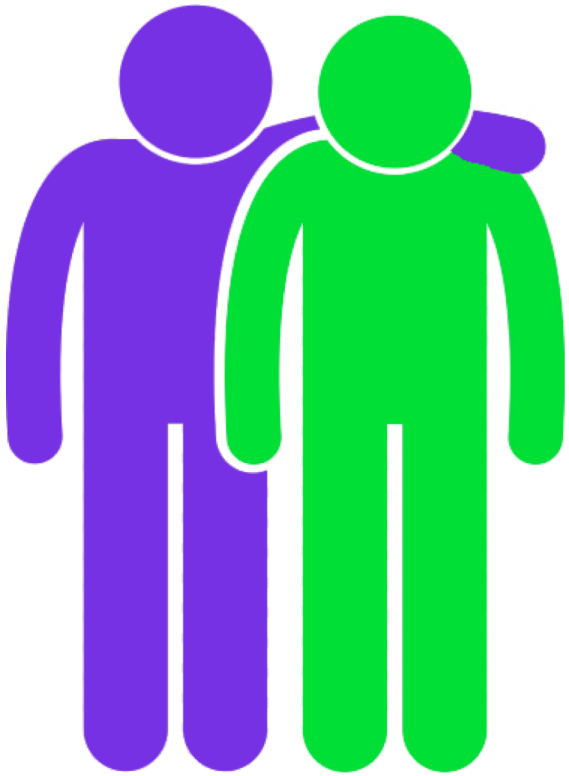


Affect

Emotion

Mood

Conceptual differences



Affect: Feelings that people experience

Emotion: Intense feeling directed at a source

Mood: More broad feeling lacking a context/stimulus

Various aspects of emotion

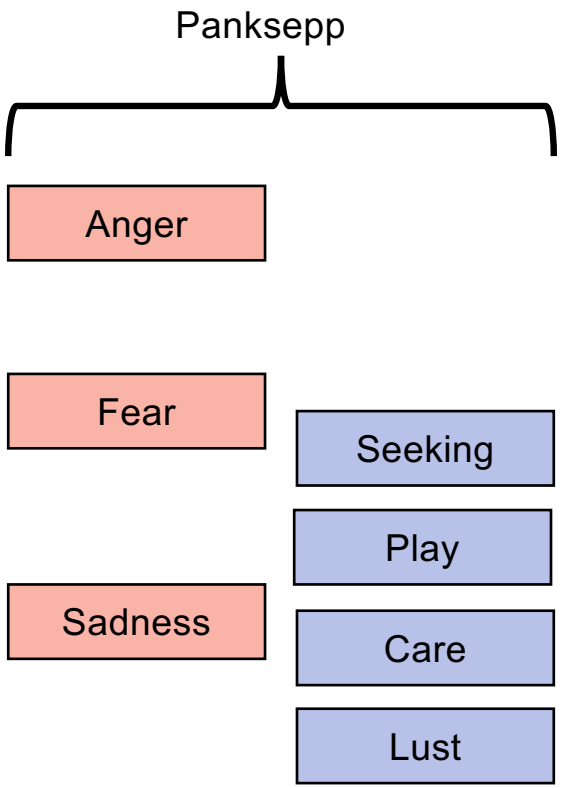
1. **Affective** (arousal)
2. **Cognitive** (appraisal/ labeling)
3. **External** stimuli definitions
4. **Physiological** (internal physical mechanisms)
5. **Expressive** (observable)
6. **Disruptive** (dysfunction)
7. **Adaptive** (organization, function)
8. **Interrelated** components
9. **Definitions** (distinguishing emotions)
10. **Motivational**

Review by Kleinginna & Kleinginna, 1981

Kinds of emotions

Basic emotions

- Anger
- Disgust
- Fear
- Enjoyment
- Sadness
- Surprise

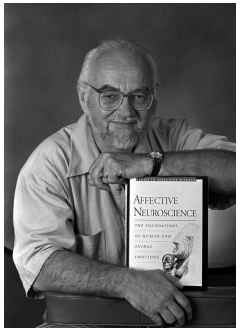


Levels of emotions

- Positive vs negative valence
- Approach vs avoidant
- Self-conscious / 2nd emotions

Kinds of emotions

Jaak Panksepp



Basic Emotional Systems	Key Brain Areas	Key Neuromodulators
General Pos. Motivation **SEEKING**/ Expectancy System	Nucleus Accumbens – VTA Mesolimbic and mesocortical outputs Lateral hypothalamus – **PAG**	**DA (+)**, glutamate (+), opioids (+), **neurotensin (+)**, **orexin (+)**, Many other neuropeptides
RAGE/ Anger	Medial amygdala to Bed Nucleus of Stria Terminalis (BNST). Medial and perifornical hypothalamic to **PAG**	**Substance P (+)**, Ach (+), glutamate (+)
FEAR/ Anxiety	Central & lateral amygdala to medial hypothalamus and dorsal **PAG**	Glutamate (+), **DBI**, **CRF**, **CCK**, **alpha-MSH**, **NPY**
LUST/ Sexuality	Cortico-medial amygdala, Bed nucleus of stria terminalis (BNST) Preoptic hypothalamus, VMH, **PAG**	Steroids (+), **vasopressin**, & **oxytocin**, **LH-RH**, **CCK**
CARE/ Nurturance	Anterior Cingulate, BNST Preoptic Area, VTA, **PAG**	**oxytocin (+)**, **prolactin (+)** dopamine (+), **opioids (+/-)**
PANIC/ Separation	Anterior Cingulate, BNST & Preoptic Area Dorsomedial Thalamus, **PAG**	**opioids (-)**, **oxytocin (-)** **prolactin (-)**, **CRF (+)** glutamate (+)
PLAY/ Joy	Dorso-medial diencephalon Parafascicular Area, **PAG**	**opioids (+/-)**, glutamate (+) Ach (+), **cannabinoids**, TRH?

Panksepp, 2011

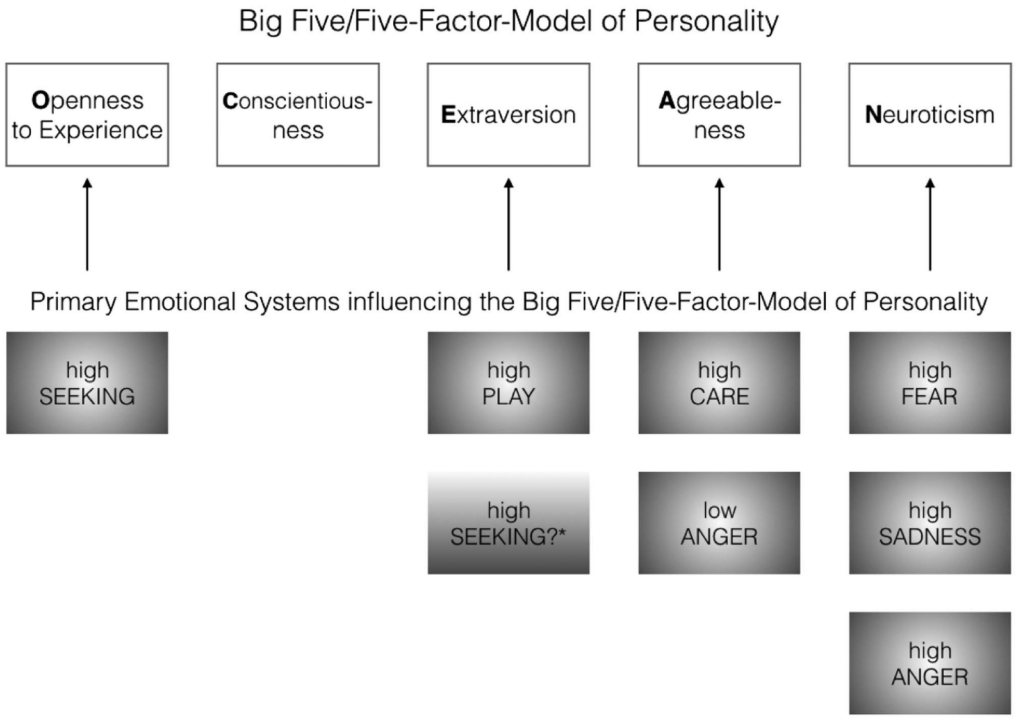
Pankseppian theories

Primary emotions are innate, do not require cortical inputs

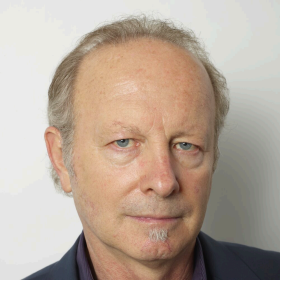
- Seeking, rage/anger, fear, lust, care, panic/sadness, play
- Foundation for identity (personality, pathology)

Neocortex is programmed via interactions with subcortical system

Davis & Montag (2009, 2018):



Emotional brain



Antonio Damasio

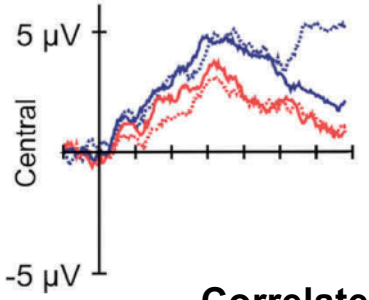
- Role of vmPFC on longer-term +/- consequences
- *The term emotion should be rightfully used to designate a collection of **responses triggered** from parts of the brain to the body, and from parts of the brain to other parts of the brain, using both neural and humoral routes.* (1998, p 84)

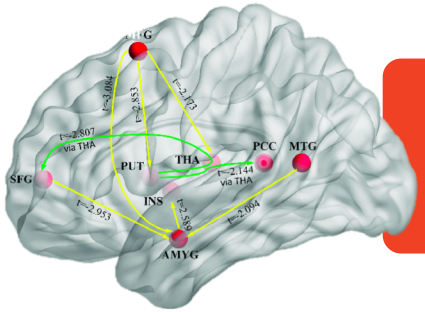
Joseph LeDoux

- Role of AMY on fear conditioning
- *In my view, **emotions** are affectively charged, subjectively experienced **states of awareness**. Emotions, in other words, are conscious states.* (1994, p291)

Review by Kleinginna & Kleinginna, 1981

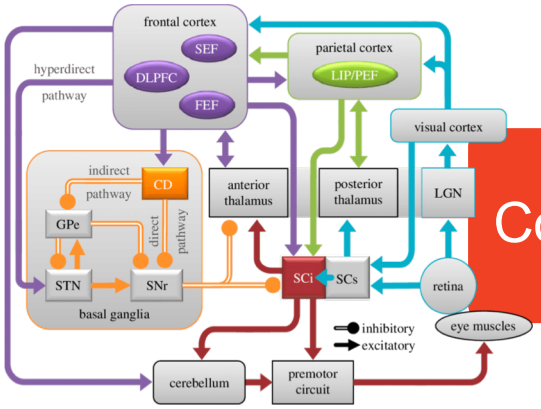
“Cognitive neuroscience triangle”





Correlates & circuits

Brain



Computations

Psychological

Emotion recognition

Are emotions distinct?
Can you be without emotions?

- Claim: Emotions are relational.
- Enculturation of emotions

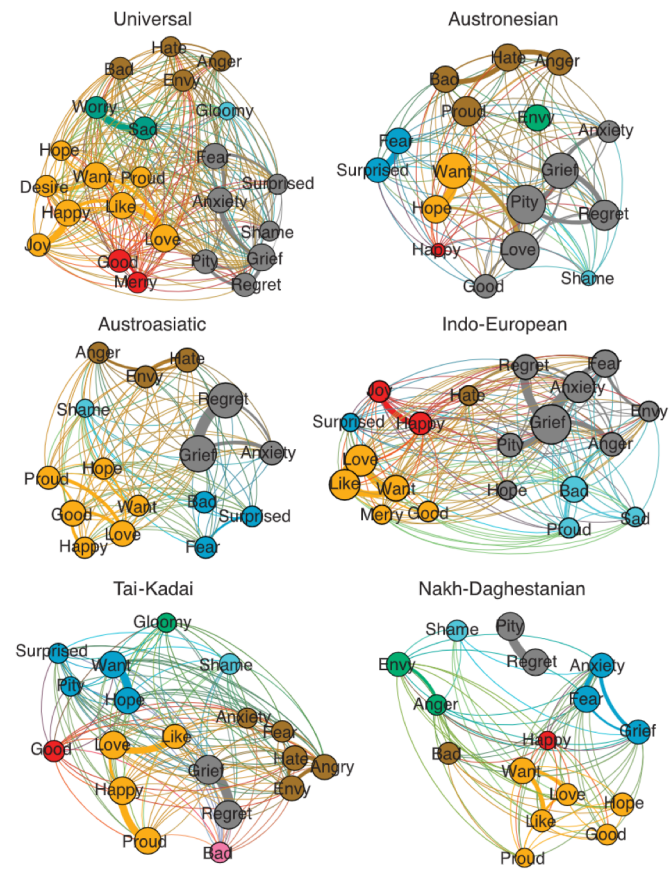
<u>Affect vs emotion theories</u>

1. Materiality
   - Brain-culture
   - Interactions with others
2. Individual differences
   - Reflexivity, responsibility, intentions, identity
3. Terminology (separation/ distinction)
4. Sociological ramifications

Anderson & Harrison, 2006

Traditional approach to emotion

- Rooted in essentialism: ’*ascribing dedicated causal mechanisms to “categories”*’
- i.e. Emotions…
  - Exist across species
  - Are present at birth
  - Universal across cultures

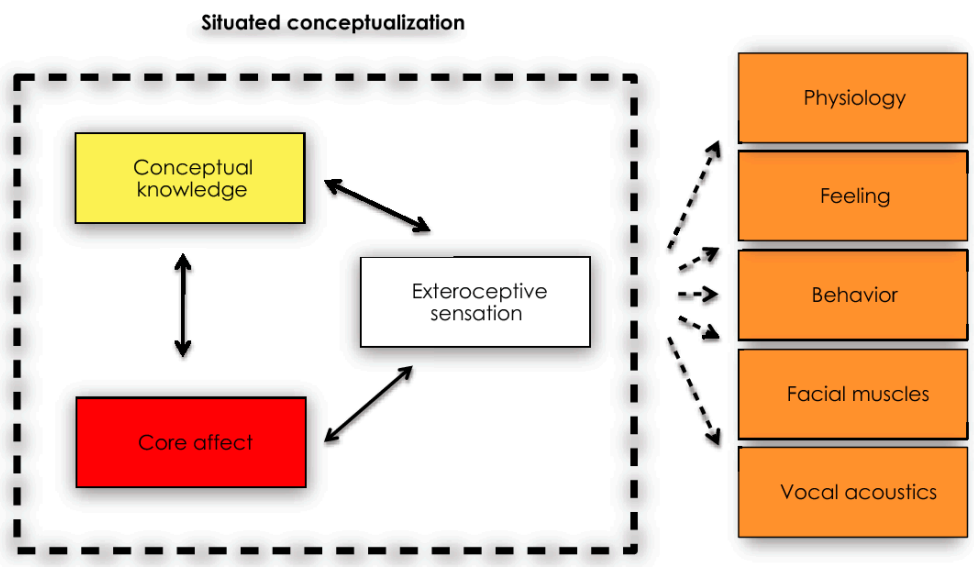


Leshin & Lindquist, 2019

Jackson et al., 2019 Science

Constructionism approach to emotion

- Emotions do not have own specific behaviors
- *Core affect* – ANS fluctuations
  - pleasure, displeasure
- *Categorization* to predict meaning behind feeling
- *Executive control* – attention to enhance/suppress info



Lindquist, 2013

Leshin & Lindquist, 2019

Next class

- **Monday January 24h: Discussion of theories**
  - Reading 1: Shackman, A. J., & Wager, T. D. (2019). The emotional brain: Fundamental questions and strategies for future research. *Neuroscience letters*, *693*, 68-74.
  - Reading 2: Dalgleish, T., Dunn, B. D., & Mobbs, D. (2009). Affective neuroscience: Past, present, and future. *Emotion Review*, *1*(4), 355-368.
  - Reading 3: LeDoux, J. (2012). Rethinking the emotional brain. *Neuron*, 73(4), 653-676.

Shackman & Wager, 2019

1. Emotions as discrete patterns of systemic activity (Nummenmaa, Saarimäki)
2. Historical pitfalls and new directions in the neuroscience of emotion (Barrett, Satpute)
3. Deconstructing arousal into wakeful, autonomic and affective varieties (Satpute et al.)
4. Development of the emotional brain (Casey et al)
5. Capacity and tendency: A neuroscientific framework for the study of emotion regulation (Silvers, Moreira)
6. Neuroimaging of person perception: A social-visual interface (Brooks, Freeman)
7. The neuroscience of understanding the emotions of others (Spunt, Adolphs)
8. Imaging empathy and prosocial emotions (Lamm, Rütgen, Wagner)
9. New tools for understanding coping and resilience (Baratta, Maier)
10. The central extended amygdala in fear and anxiety: Closing the gap between mechanistic and neuroimaging research (Fox, Shackman)
11. The emotional brain: Fundamental questions and strategies for future research (Shackman, Wager)

Davidson & Sutton, 1995

Three themes:
1. Emotion & its components
2. Cortical ←→ Subcortical
3. Individual differences