

Course introduction

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University of South Carolina

PSYC 888– Affective (Cognitive) Neuroscience

Spring 2023

Overview

- Introductions
- Review syllabus together
- Pick special topics
- Any other special requests?

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

Attendance



Record



Review of syllabus

Importance of Affect/Emotion

Importance of affective neuroscience?

Special topics

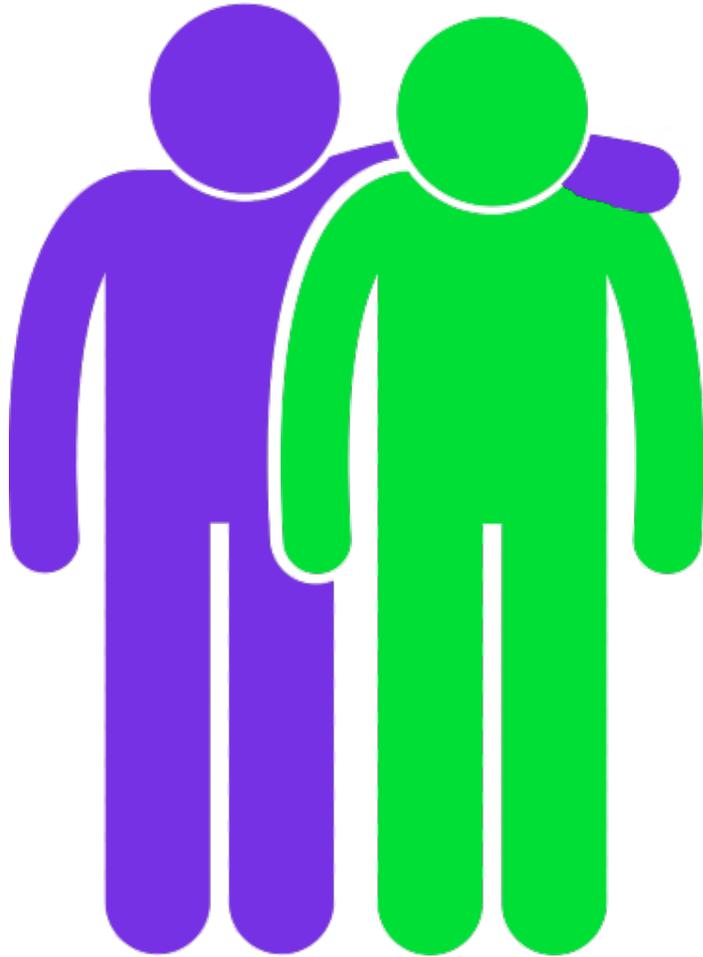
Before spring break (5)

1. **Major theories (Sewon)**
2. **Anatomy/systems (Jake) → Systems**
3. **Role of cognition and attention (Jonathan)**
4. **fMRI / fNIRS topical papers (Xuan)**
5. ET / EEG topical papers

After spring break (4)

1. **Early and late development of the affective brain (Alexis)**
2. **Elicitation of affective responses (Jake/Caitlin)**
3. **Love & cultural considerations (Amber)**
4. Nonverbal/minimally verbal approach to affective neuroscience
5. **Response to stress and interactions with health (Miranda)**
 1. **CH will also emphasis sleep and biofeedback topics in lecture** Utility of affective neuroscience as treatment (biofeedback, mindfulness intervention, TMS/tES)
6. Emotion and affect regulation

Conceptual differences

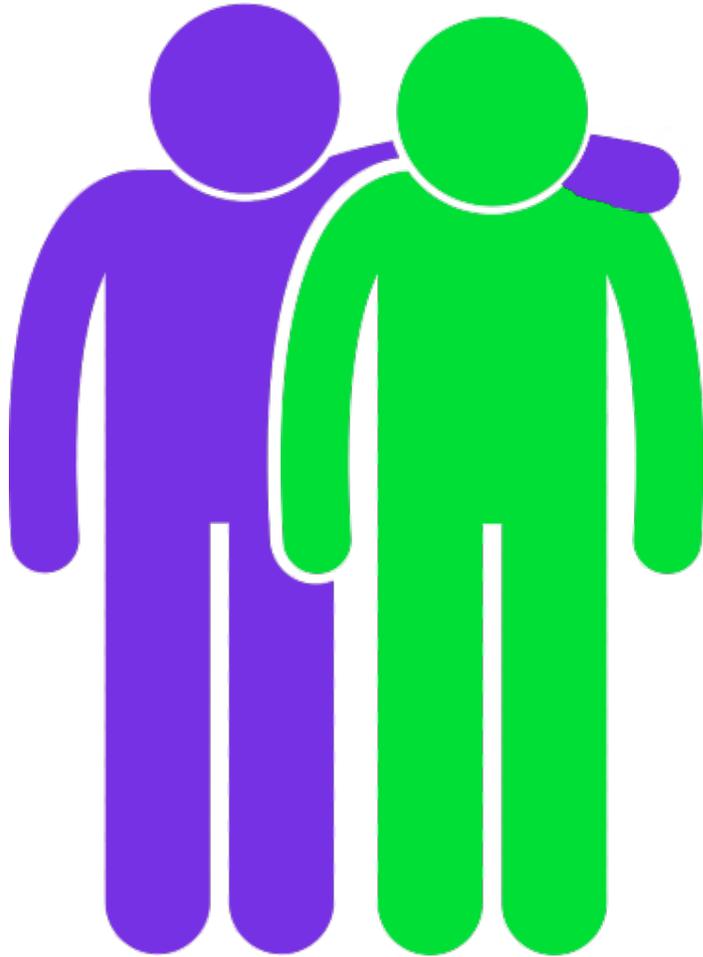


Affect

Emotion

Mood

Conceptual differences



Affect: Feelings that people experience

Emotion: Intense feeling directed at a source

Mood: More broad feeling lacking a context/stimulus

List of emotions?

Various aspects of emotion

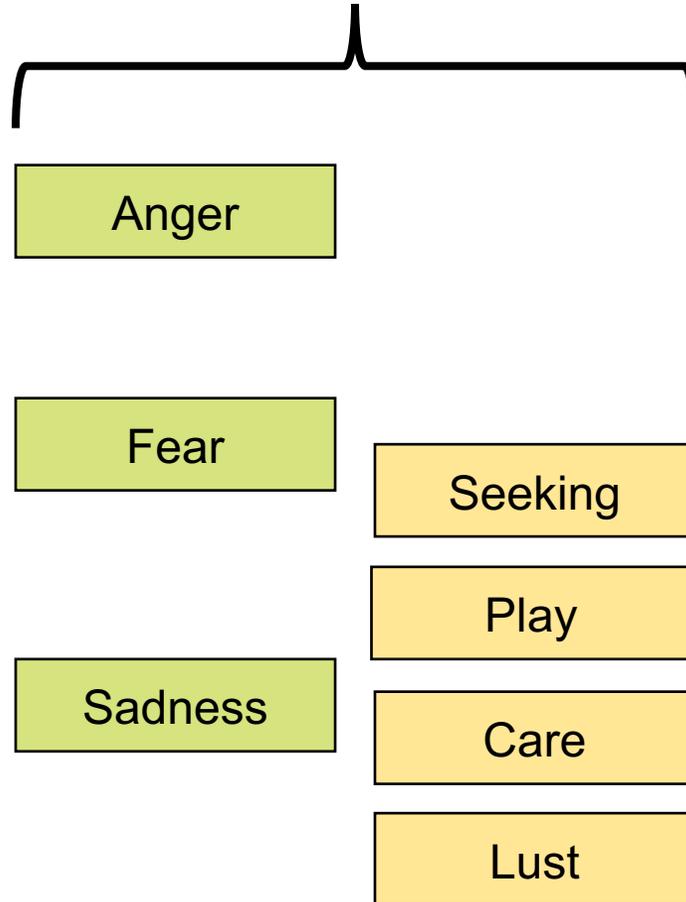
1. **Affective** (arousal)
2. **Cognitive** (appraisal/ labeling)
3. **External** stimuli definitions
4. **Physiological** (internal physical mechanisms)
5. **Expressive** (observable)
6. **Disruptive** (dysfunction)
7. **Adaptive** (organization, function)
8. **Interrelated** components
9. **Definitions**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

Kinds of emotions

Panksepp

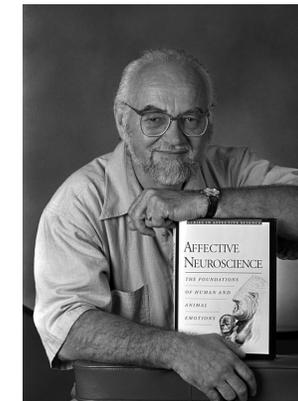
Basic emotions

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



Levels of emotions

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



Kinds of emotions

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?**



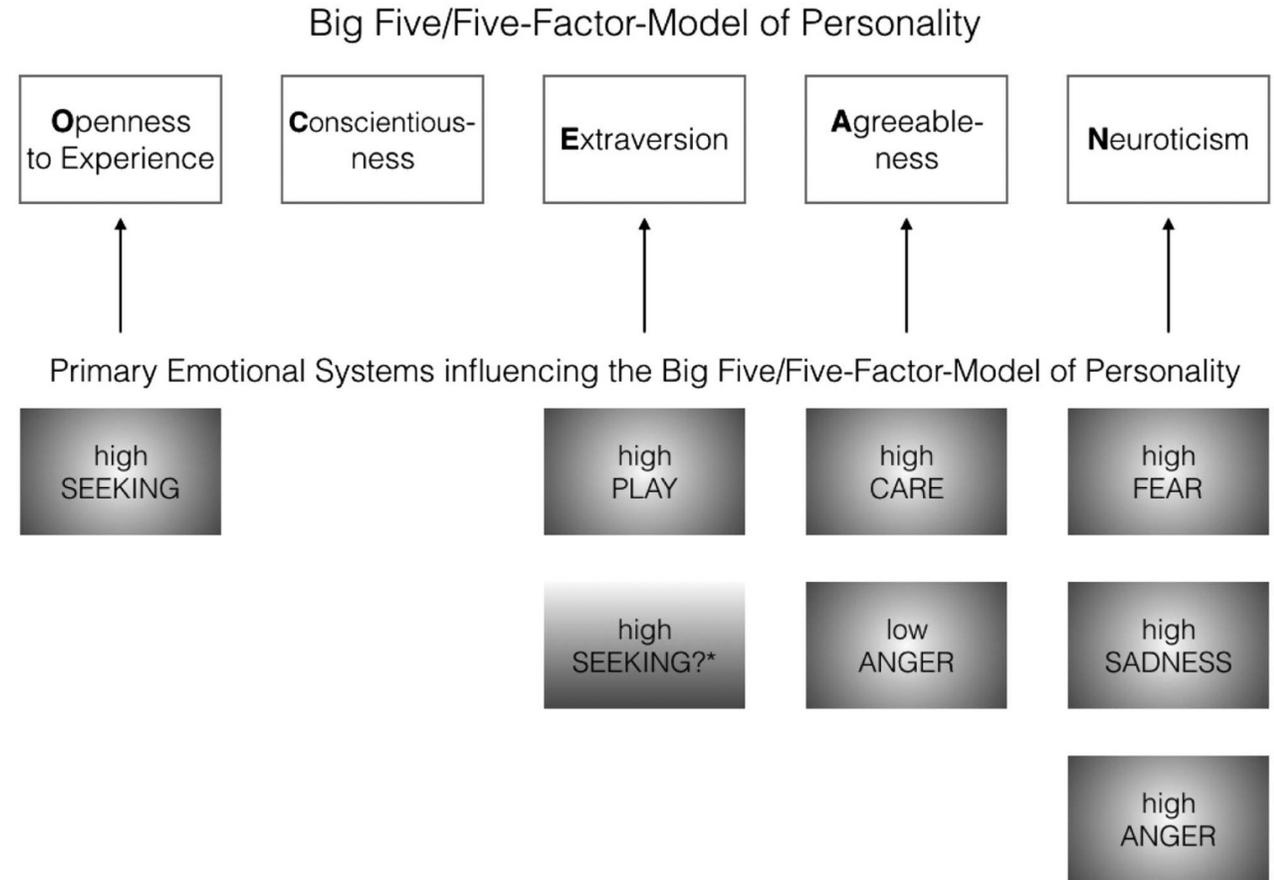
Pankseppian theories

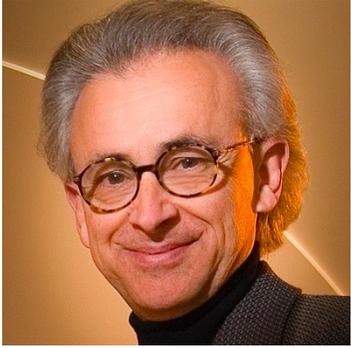
Primary emotions are innate,
do not require cortical inputs

- 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

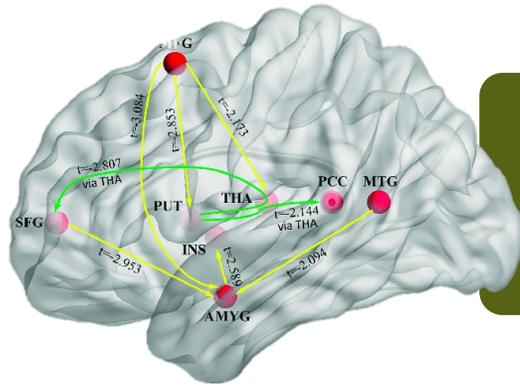
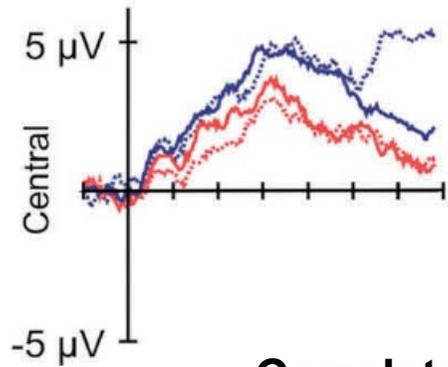
- *The term emotion should be rightfully used to designate a collection of **responses triggered** from parts of the brain to the body, and from parts of the brain to other parts of the brain, using both neural and humoral routes. (1998, p 84)*

Joseph LeDoux

Role of AMY on fear conditioning

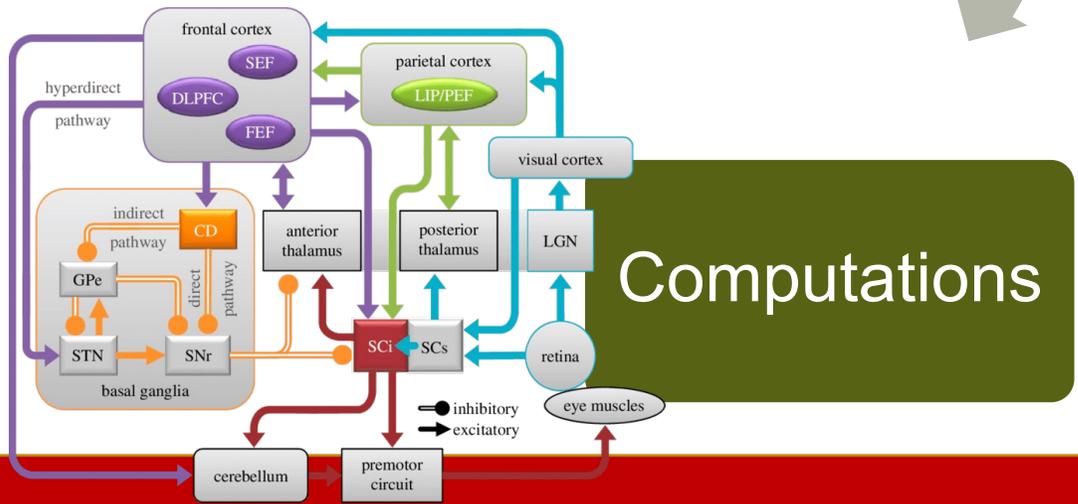
- *In my view, **emotions** are affectively charged, subjectively experienced **states of awareness**. Emotions, in other words, are conscious states. (1994, p291)*

“Cognitive neuroscience triangle”



Brain

Correlates & circuits



Computations

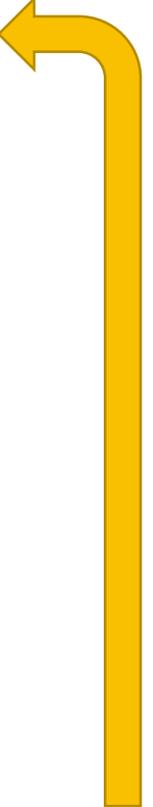
Emotion recognition



Psychological

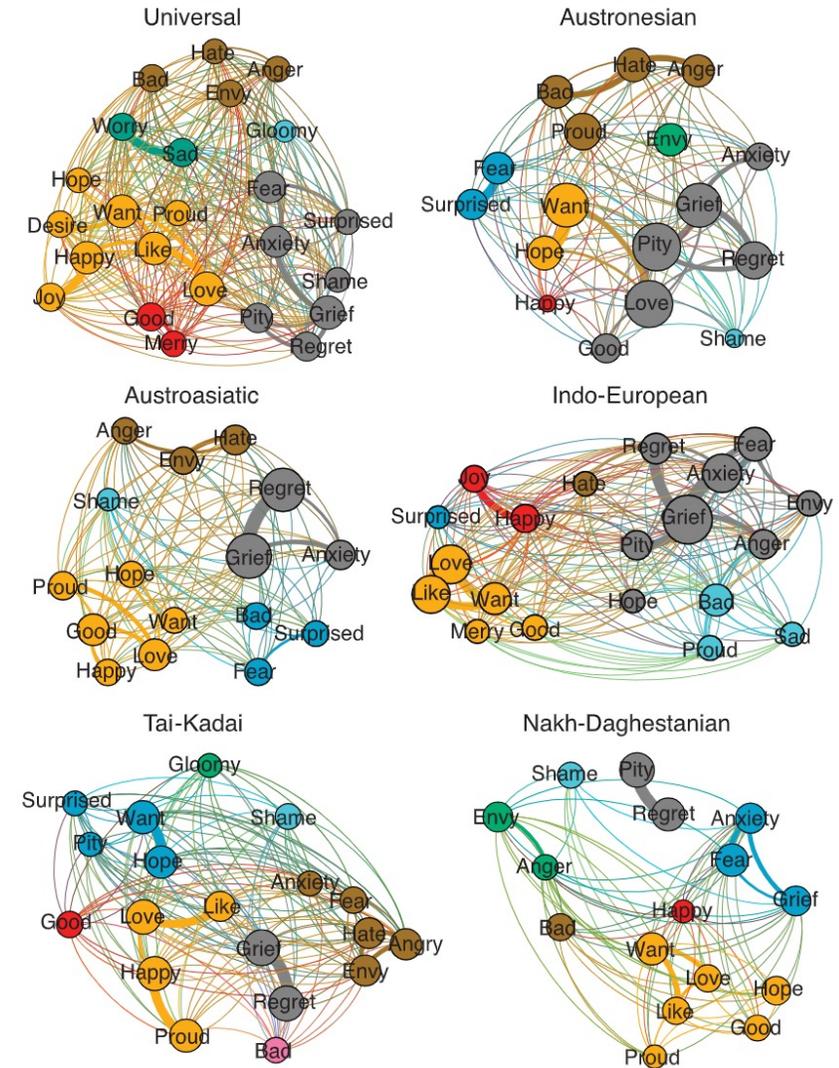
Are emotions distinct?

Can you be without emotions?

- Claim: Emotions are relational.
 - Enculturation of emotions
- Affect vs emotion theories
1. Materiality
 - Brain-culture
 - Interactions with others
 2. Individual differences
 - Reflexivity, responsibility, intentions, identity
 3. Terminology (separation/distinction)
 4. Sociological ramifications
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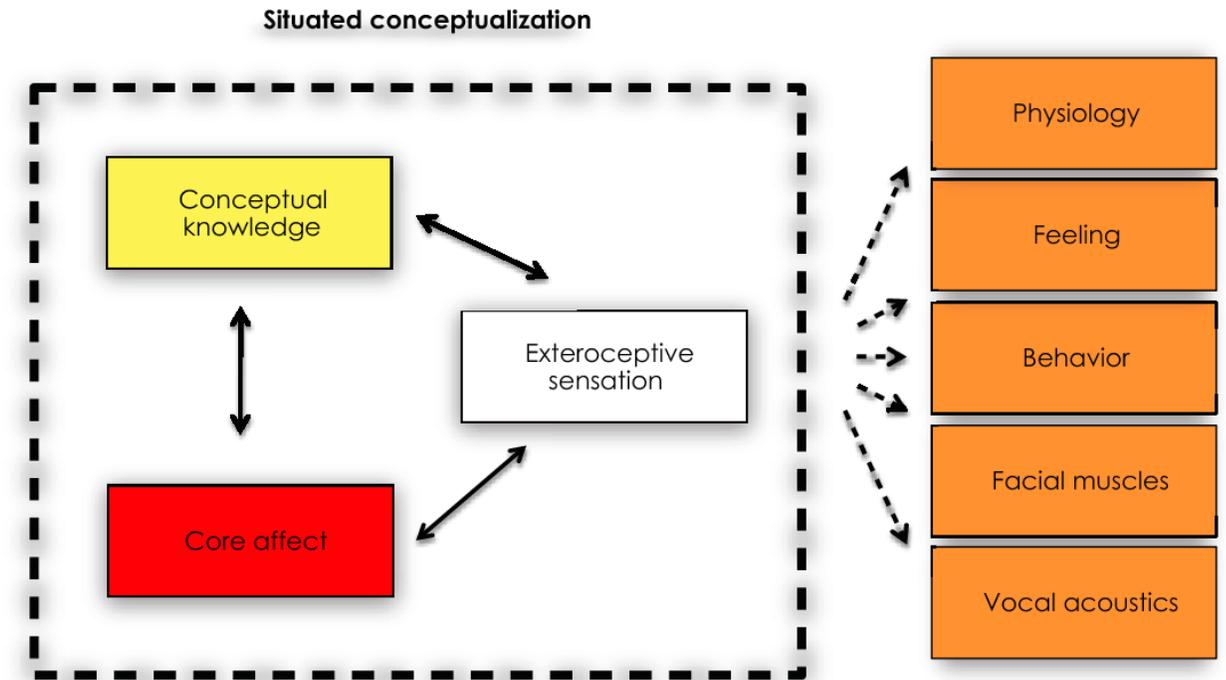
Traditional approach to emotion

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



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

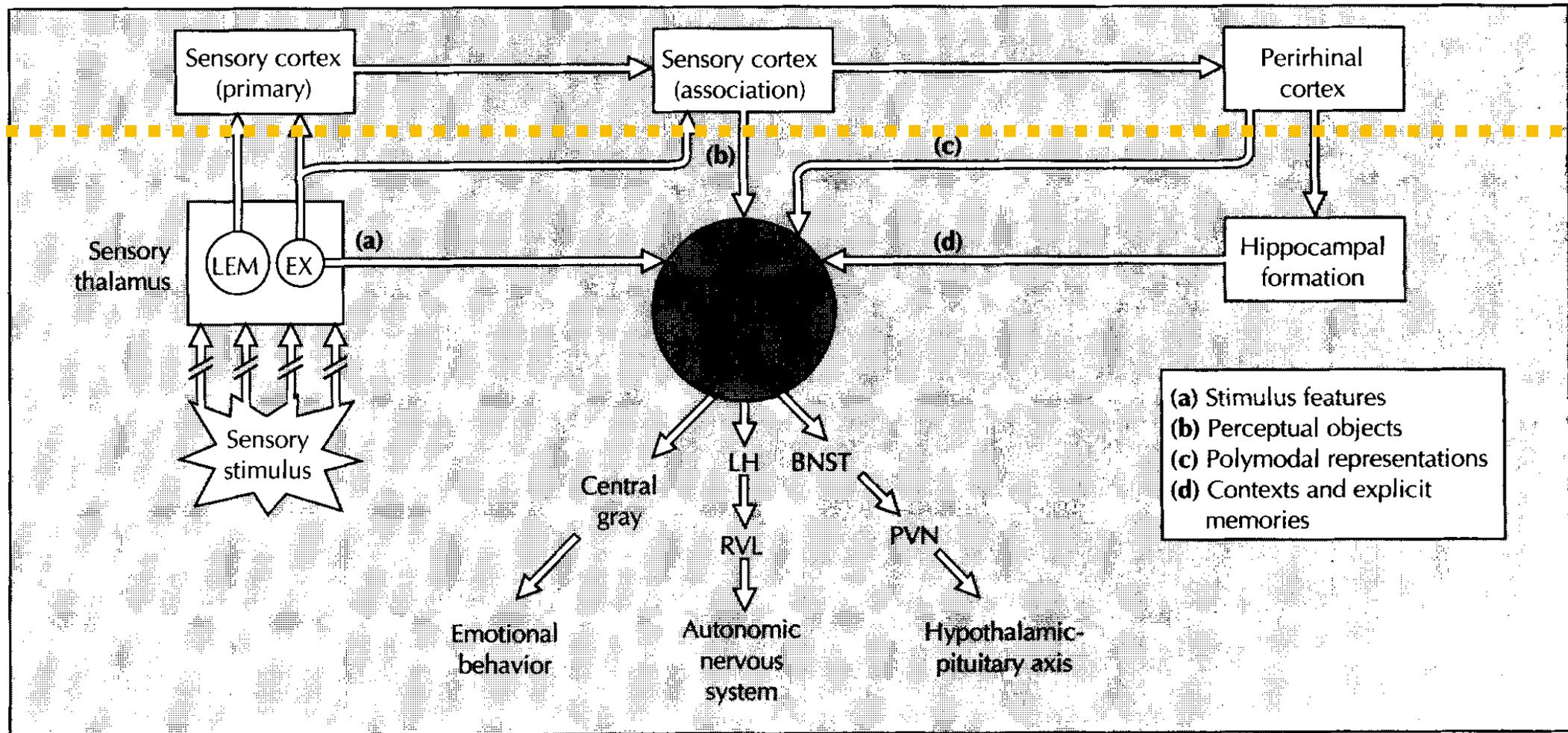


Lindquist, 2013

Davidson & Sutton, 1995

Three themes:

1. Emotion & its components
2. Cortical \leftrightarrow Subcortical
3. Individual differences



Next class

NO CLASS NEXT MONDAY!

Monday January 23:

- **Discussion** = What is emotion? What is affect? Major theories and the link to cognition
 - Leshin, J. C., & Lindquist, K. A. (2020). Neuroimaging of emotion dysregulation.
 - Dalgleish, T., Dunn, B. D., & Mobbs, D. (2009). Affective neuroscience: Past, present, and future. *Emotion Review*, 1(4), 355-368.
 - * Barrett, L. F., & Satpute, A. B. (2019). Historical pitfalls and new directions in the neuroscience of emotion. *Neuroscience letters*, 693, 9-18.
 - * Spunt, R. P., & Adolphs, R. (2019). The neuroscience of understanding the emotions of others. *Neuroscience letters*, 693, 44-48.
- *Consider reading other articles in the *Neuroscience Letters* special issue: Functional Neuroimaging of the Emotional Brain
- **Lecture** = The anatomy of feelings

Neuroscience Letters 2019 special issue

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)