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Cognition and Emotion

Lecture 6: Introduction to Emotion

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Lecture Overview

- ▶ What is Emotion?
- ▶ Theories of Emotion
 - ▶ Appraisal Theory
- ▶ Emotion and the brain
 - ▶ Neural pathways
- ▶ Emotion and Psychopathology
- ▶ Lecture Summary

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What is Emotion?



Easy to answer,
right?.....

- ▶ Actually difficult to understand
- ▶ Consider Philosophical, Biological and Psychological aspects.
- ▶ Many definitions, different theories, and disagreement regarding components involved.

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Structure of Emotions:

- ▶ Two main schools of thought (Fox, 2008)
 1. Categorical approach (e.g., Izard, 2007)
 - There are several distinct emotions
 2. Dimensional approach (e.g., Barrett & Russell, 1998)
 - Emotion ranges from "Good" to "Bad"
- These approaches can be reconciled by considering each category of emotion within the dimensions
 - E.g., happy = positive emotion 🤗

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What is Emotion?

- ▶ Distinction between mood and emotion
 - ▶ A mood lasts longer than an emotion
 - ▶ Emotions are intense
 - ▶ Emotions are caused by a specific event
- ▶ Emotions can turn into moods and vice versa
- ▶ Term **affect** is used to encompass both
- ▶ **Valence** = dimension of emotion running from very negative to very positive



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What is Emotion?

- ▶ Two key traditions:
 1. Feeling theory – conscious feeling is by-product of bodily response
 - Stems from Plato's dualism philosophy
 2. Functionalism – need to state what the function of emotion involves
 - Stems from Aristotle – knowing components of something is insufficient, must also know its function



What is Emotion?

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- ▶ Major aspect of Aristotle's approach is that beliefs can lead to different emotions
- ▶ The external event/object is not important but your belief about it under a given context is key.



Emotional Response to this?

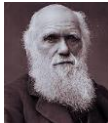
- ❖ Sharpe → dangerous = fear
- ❖ Sharpe → used to untie if trapped = relief
- ❖ Sharpe → chops food when hungry = happy

Function of object in that context changes emotion

Theories of Emotion

Evolution of Emotional Expression: Darwin

- Emotional responses (e.g., facial expression) accompany emotional states
- Expressions of emotion evolve from behaviors that indicate what an animal is likely to do next
- If emotional signals are beneficial, they will evolve to more effectively communicate and may lose original meaning



Theories of Emotion

Evolution of Emotional Expression: Darwin

- Opposite messages are often signaled by opposite movements – ***"principle of antithesis"***
- E.g., threat displays are beneficial – intimidate victims without the costs and risks for fighting



Theories of Emotion

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Feelings: James-Lange Theory (1884)

► Feeling theory embraced by Psychology under William James.



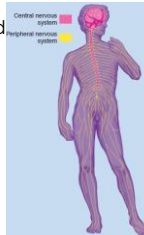
- Emphasis on physiology
- Body reacts to situations (e.g., danger) with bodily responses (Inc. breathing, heart rate etc.)
- Emotions: result of body reacting in different ways
- Emotion is our perception of a bodily response
- Emotions do not involve specialised brain centres

Theories of Emotion

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Feelings: James-Lange Theory (1884)

- A stimulus that induces emotion is received and interpreted by the cortex.
- This causes changes in the visceral organs via the autonomic nervous system and in the skeletal muscles via the somatic nervous system.
- Then the autonomic and somatic responses trigger the experience of emotion in the brain.



Theories of Emotion

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Feelings: James-Lange Theory (1884)

Stimulus → Response → Feeling

"I see a bear"

"I run from bear"

"I'm afraid"

- **Carl Lange:**
- Each emotion is linked to unique physiological response
- E.g., fear feels different to love because our body responds differently in fear and love inducing situations

Theories of Emotion

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Alternative: Cannon-Bard Theory (1915/1927)

- Walter Cannon was studying 'emergency reactions' such as fear, hunger, and pain.
- He noted that the autonomic nervous system was activated in many emotions
- He believed it activated in a uniform way in anticipation of action, rather than a reaction to it
- Also, we often feel the emotion before the ANS kicks in, suggesting James must be wrong



Theories of Emotion

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Alternative: Cannon-Bard Theory (1915/1927)

- Emotional experience and expression happen in parallel
- Also, certain physiological states can affect >1 response
- Dutton and Aron (1974) asked men to tell a story to an attractive woman whilst either standing on safe ground or an (unsafe) bridge
 - Stories from the unsafe bridge had a higher sexual content, due to arousal from danger



Theories of Emotion

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Appraisal Theories

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- ▶ Arnold (1960): concerned with missing piece of the puzzle
 - ▶ What causes the reaction in the first place?
 - ▶ Must be an appraisal process which allows us to analyse a situation
 - ▶ E.g., Anger is often the result of being offended
 - ▶ Offence requires an evaluation of the situation and can involve cultural norms and values
 - ▶ In the Inuit culture, displays of anger are rarely seen (Briggs, 1970), so anger is unlikely to be a simple bodily reaction

Appraisal Theories

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- ▶ Cognitive processes influence **when** we experience emotional states and **what** emotional state we experience in a situation.
- ▶ The most important aspect of these cognitive processes is **Appraisal** of the situation.
- ▶ Many appraisal theories exist.....
 - ▶ Most assume each emotion is elicited by its own specific and distinctive appraisal.

Appraisal Theories

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Appraisal Theories

- ▶ For Arnold (1960) an appraisal produces an action tendency (bear → run)
- ▶ The feeling is the outcome of this process
- ▶ According to Arnold this is unconscious as it happens
 - ▶ However, we should be able to reflect back on the appraisal process afterwards to examine what happened

Appraisal Theories

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- ▶ Appraisal is now considered a central process in emotion theories
- ▶ Feelings influence, and are influenced by, cognitions (Forgas & Smith, 2003; Haddock & Zanna, 1999; Smith & Lazarus, 1990)
- ▶ Thus **top-down** processing plays a crucial role in appraisal theories.

Appraisal Theories

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- ▶ Primary & Secondary Appraisals: Smith & Lazarus (1990)
 - ▶ **Primary appraisals**
 - ▶ How relevant is what is happening in this situation to my needs and goals?
 - ▶ Is this congruent or incongruent to my needs and goals?
 - ▶ **Secondary appraisals**
 - ▶ How responsible am I for what is happening in this situation?
 - ▶ How responsible is someone or something else?
 - ▶ Can I act on this situation to make it or keep it as I want?
 - ▶ Can I handle and adjust to this situation regardless of how it turns out?
 - ▶ Do I expect this situation to improve or get worse?

Conscious Appraisal vs. non-conscious emotional processing

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- ▶ Appraisal does not always involve deliberate conscious processing
- ▶ It can also occur automatically without conscious awareness
- ▶ Smith and Kirby (2001, 2009) distinguish between appraisal based on reasoning (deliberate thinking) and appraisal based on activated memories (automatic).



Evidence for Conscious Appraisal

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- ▶ Research makes use of scenario studies
 - ▶ Ps identify with character in various scenarios with different appraisals to assess the emotional experiences they generate (e.g., Smith & Lazarus, 1993).
- ▶ But difficult to know if emotion is accounted for by appraisal manipulations
 - ▶ Also, hypothetical scenarios do not lead to genuine emotional experience.

Evidence for Conscious Appraisal

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- ▶ But, applied research has rectified this:
- ▶ Bennett and Lowe (2008): found that anger and frustration identified by nurses during a stressful work-related incident were predicted by the nurses' appraisals
 - ▶ The exception was sadness – probably as it is used to refer to negative experiences generally.

Evidence for Conscious Appraisal

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- ▶ The conscious appraisal approach can help explain individual differences in emotional reactions to a situation.
- ▶ However, it cannot explain causality (only an association/correlation).
- ▶ Possibility of manipulating people's cognitive appraisals when confronted with emotional stimuli.

Evidence for non-Conscious emotional processing 25

- Information being processed below the level of conscious awareness can produce emotional reactions:

- Öhman and Soares (1994): Snake and spider phobia Ps presented with pictures so rapidly they could not identify them consciously.



- Responded more emotionally to snake and spider pictures than to flowers and mushrooms.

- Also displayed greater physiological responses



Evidence for non-Conscious emotional processing 26

- Winkielman et al. (2005): presented happy and angry faces subliminally to thirsty Ps.

- Those presented with happy faces poured and drank twice as much liquid compared to those presented with angry faces.

- In another Exp. thirsty Ps were willing to pay more for a drink after being presented with happy subliminal faces than angry ones.



Appraisal Theories 27

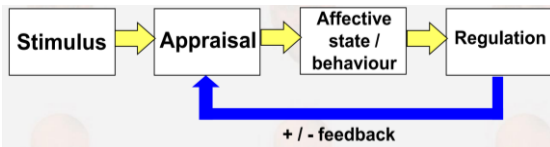
- Phillips et al. (2003a): reviewed neurobiological studies and argued for a three stage model (after stimulus):

1. Appraisal / identification of stimulus
2. Production of affective state in response
 - ANS, neuroendocrine, motor responses and conscious feeling
3. Regulation: experience, expression/action can be modified to be contextually appropriate

Appraisal Theories

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► Phillips et al. (2003a):



Note: addition of regulation stage, allows an understanding of affective disorder within a normal model of emotion

Emotion and the brain

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- Neural Pathways to Emotion
- Phillips et al. (2003) argue for two neural systems - Ventral system and dorsal system
 - **Ventral system** (amygdala, insula, ventral striatum, ventral regions of the anterior cingulate cortex)
 - Involved in appraisal and production of affective state stages
 - **Dorsal system** (hippocampus, dorsal regions of the anterior cingulate cortex and prefrontal cortex)
 - Involved in regulation stage

Emotion and the brain

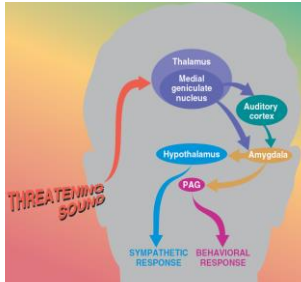
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- The **amygdala** – key area for emotion processing in the brain



Amygdala and Fear Conditioning

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LeDoux and colleagues:
Lesions of the amygdala block fear conditioning.

The amygdala receives input from all sensory systems.

Appears to be responsible for adding emotional significance to other stimuli.

Amygdala projects to brainstem regions that control emotional behavior output.

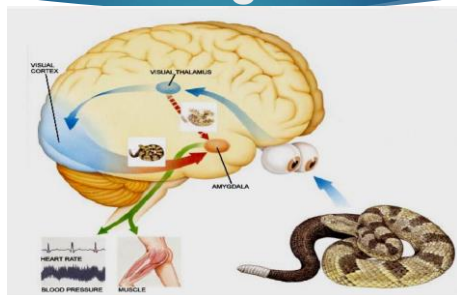
Amygdala and Fear Conditioning

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- ▶ LeDoux (1998) has gathered considerable evidence for two pathways in the processing of fear
- ▶ The fast route, quick, inaccurate, life saving:
 - ▶ Sight → Thalamus → Amygdala
- ▶ The slow route, precise, complex, sluggish:
 - ▶ Sight → Thalamus → Visual cortex → Amygdala
- ▶ One allows for instant action and is relatively inaccurate so is liable to false positives
- ▶ Whilst the other is more precise and can reduce fear response if the situation is deemed to be safe after all

Amygdala and Fear Conditioning

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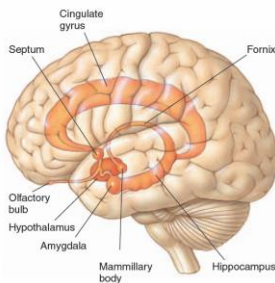
The Limbic System

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- ▶ Papez (1937) proposed an emotional circuit, which works together to influence cognition & emotion.
- ▶ Emotional expression is controlled by interconnected nuclei and tracts that form a ring around the thalamus.
- ▶ Key structures: amygdala, mammillary body, hippocampus, fornix, cortex of the cingulate gyrus, septum, olfactory bulb, and the hypothalamus.
- ▶ Emotional states are expressed through action of circuit structures on the hypothalamus and emotion is experienced through action of structures on the cortex.

The Limbic System

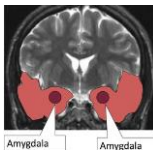
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Kluver-Bucy syndrome

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- Helps us better understand emotion
- Named after Kluver and Bucy who noticed that monkeys with anterior temporal lobes removed showed unusual behaviors
- E.g., wanting to eat everything, increased sexual activity, investigate familiar objects, putting objects in their mouth, and a lack of fear.
- Most symptoms come from amygdala damage.
- Also seen in humans with brain infection.



Damasio et al. (1994)

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- ▶ Damasio links secondary emotion with orbito-frontal / ventromedial cortex (behind eyes)
- Phineas Gage suffered severe emotional disturbance after damage to OFC in 1848



Damasio on Emotions

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- ▶ Damasio (1994): makes distinction between feelings and emotions.
- ▶ Argues emotions are just bodily reactions to mental states but feeling requires joint perception of:
 - ▶ the causative object
 - ▶ the ensuing emotional state
 - ▶ the related thought that follows
- ▶ Arousal will not result in an emotion unless there is a context to reflect on (e.g., Schacter & Singer, 1962)

Damasio on Emotions

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- ▶ Argues that 'pre-feeling' emotion can arise from bodily feedback, or simulated feedback in the brain's somatosensory maps.
- ▶ May be the basis of 'gut feelings', where decisions are guided without conscious knowledge of the source of information
 - ▶ Known as 'somatic marker hypothesis'
 - ▶ However, it is not a popular theory with everyone
 - ▶ Rolls (1996) calls it a "weakened version of the James-Lange theory from the last century"

Emotion and Psychopathology

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- ▶ Phillips et al. (2003b) have reviewed research investigating the function of neural pathways for emotion in different psychiatric illnesses.
- ▶ They argue that specific impairments have a direct causal link with specific symptoms
- ▶ However, emotion may be involved in disorders which at first may not seem to have an obvious emotional pathology

Capgras Delusions

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- ▶ The delusion that (usually) a spouse or family member has been replaced by an identical looking impostor
- ▶ "Mrs. D, a 74-year old married housewife, recently discharged from a local hospital after her first psychiatric admission, presented to our facility for a second opinion. At the time of her admission earlier in the year, she had received the diagnosis of atypical psychosis because of her belief that her husband had been replaced by another unrelated man. She refused to sleep with the imposter, locked her bedroom and door at night, asked her son for a gun, and finally fought with the police when attempts were made to hospitalise her. At times she believed her husband was her long deceased father. She easily recognised other family members and would misidentify her husband only."

From Passer and Warnock (1991)

Capgras Delusions

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- ▶ Ellis et al. (1997) measured skin conductance when people with Capgras viewed familiar faces
 - ▶ Despite being able to consciously distinguish between familiar and unfamiliar faces...
 - ▶ They showed no difference in emotional arousal
 - ▶ Suggests they have impaired unconscious emotional response to familiar people
 - ▶ This may be why they believe them to be impostors ("They look like them but I feel as if they are not")

Lecture Summary

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- ▶ James-Lange: emotions arise from physiological responses to situations
- ▶ Cannon-Bard: physiological responses arise from emotions
- ▶ Arnold: need to understand appraisal processes and regulation
- ▶ Two neural routes to fear response reported
 - ▶ More complex (secondary) emotions may take more complex route, through OFC
 - ▶ Impairment to routes may play role in psychopathology
- ▶ Understanding social, cognitive & neurological/physiological factors involved are major challenges facing modern social/cognitive psychology
- ▶ What is emotion?
 - ▶ Contains*:- An instigating event, an interpretation and subsequent appraisal of that interpretation, that is causal of physiological change and a state of potential for action – Conscious experience of the components (Power & Dalgleish, 2016).
 - ▶ *each of these components is subject to debate
