

Emotions, Aggression and Stress (Ch.15) I

- Defining Emotions
 - What are they, how do they develop?
- Theories of Emotions
 - Brain regions mediating emotions
 - Hemispheric differences
 - Limbic system, Prefrontal cortex

Defining Emotion

At least four different aspects to emotions:

1) **Physiological Arousal**: displays of somatic and autonomic responses, facial expressions

- Emotional reactions help us respond quickly to emergency event

2) **Motivational Programs**: coordinated responses designed to solve specific tasks/achieve specific goals

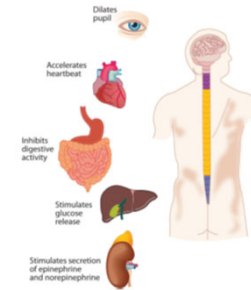
- Generated by distinct brain systems

3) **Actions**: typically, emotions cause us to do something

- Specific behaviours designed to achieve motivational goals

4) **Feelings**: subjective labels placed on an emotional state

Emotions = overarching term



Can study in humans/ animals; presenting disincentive ("avoid") or incentive ("approach")



Feelings = subjective label that we (humans) place on emotional state

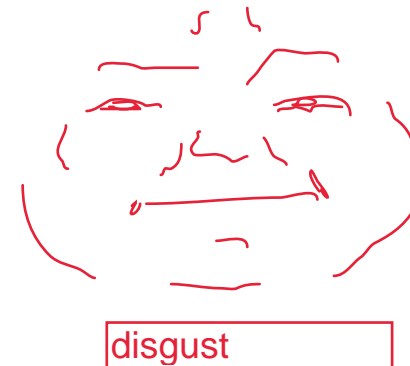
- Humans experiences all 4 aspects; in animals, we can only assess 1-3

Human Development of Emotion

- Children show some emotions as birth, show all of the “**basic**” emotions by 8 months, and achieve most emotions displayed by adults by age 3.
- **Birth: distress** and **contentment** unhappiness vs not unhappy
- **3 months: joy** (will smile, show excitement)
 - sadness following withdrawal of positive events
 - disgust
- **4-8 months: Anger** (frustration) and **surprise, fear** fear = antiipation of negative
- **18-24 months:** self awareness develops; ability to predict emotions of others: embarrassment, empathy, envy
- **2-3 years:** become able to evaluate behaviour against a standard. Emotions such as **pride**, shame and guilt emerge. Lying (default avoidance of negative consequence)
- **Development of latter emotions parallels development of frontal lobe functions** "Rebecca are you poopin?"

Prediction ability = frontal lobe development, allows for more complicated emotion

3





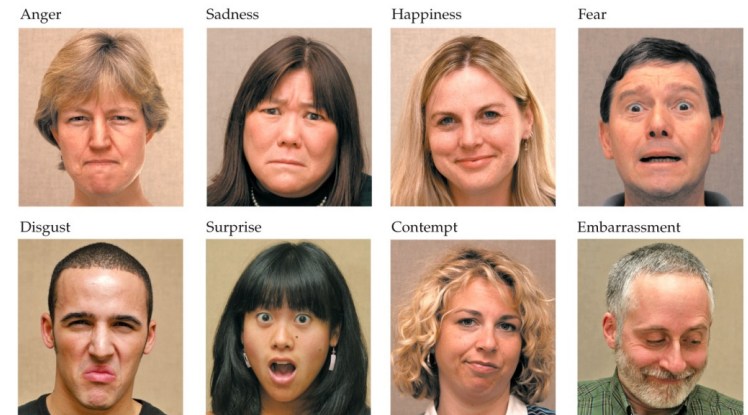
Rat Clenches Fist of Rage



Facial Expressions of Emotions

- Basic expressions common across many cultures
 - No specific training required to identify them
- Cross-cultural similarity in emotional expression, with culture-specific differences in display and interpreting emotional faces
 - Cultural differences may modulate facial expression of emotions (exaggerate, suppress etc)

Even rats have facial expressions!



BIOLOGICAL PSYCHOLOGY 7e, Figure 15.4
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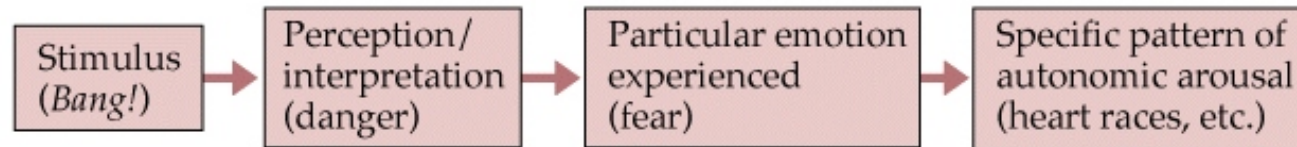
Survival value

- **Paralinguistic theory:** face is active as communication channel, not just a reflection of internal emotions
 - May help communicate and alert conspecific members of a group about impending important events
- Context plays a large role in determining how a facial expression is interpreted
 - Show still photos of actors expressing emotions from movies = less agreement on what emotion is being expressed than if shown scene from movie

Theories of Emotions (1)

(a) Folk psychology

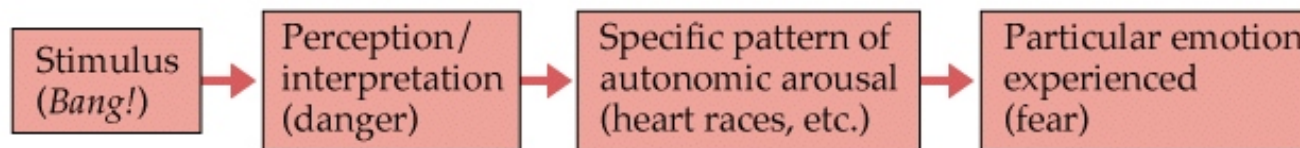
"I am scared so I am running away from the bear"



Old school-common sense view of emotions emphasized that feelings/emotions always precedes the physiological arousal, in a linear sequence

(b) James-Lange theory

"I am scared because I am running away from the bear"

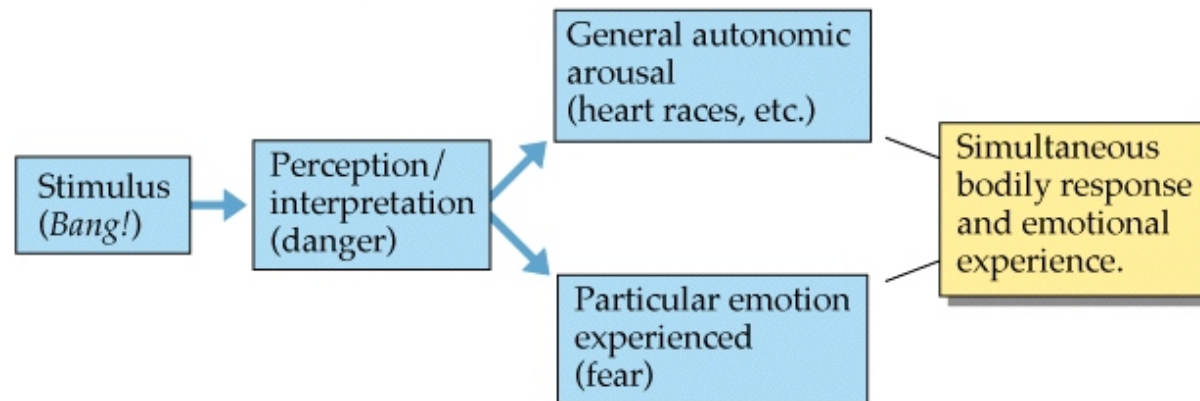


William James and Carl Lange challenged that idea.

- Emotion-provoking stimuli in our environment causes the arousal FIRST
- Arousal leads to a perceived emotion; **different emotions** mediated by **different patterns of arousal**
- **PROBLEMS:** physiological arousal can **sometimes** be similar across different emotions
- Predicts that emotions are entirely dependent on feedback from body Emotion can be detected without arousal
 - *Not true: people with spinal cord injuries can still experience emotions*

Theories of Emotions (2)

(c) Cannon-Bard theory



W. Cannon and P. Bard challenged James-Lang

- Stimuli in our environment causes **simultaneous** increase in arousal AND perception of emotional experience
- Brain sees stimulus and 1) decides which emotion is appropriate and 2) activates arousal systems of the body
- Proposed that both are **parallel and independent pathways** that do not influence each other
- Which one is correct? We had to wait 40 years to find out. Behaviourism increase = emotional research decrease

“Folk” view of emotion:

Stimulus → perception → emotion → arousal

James + Lang:

Stimulus → perception → arousal → emotion

Cannon + Bard:

Simultaneous emotion + arousal → bodily response + emotional experience

summary

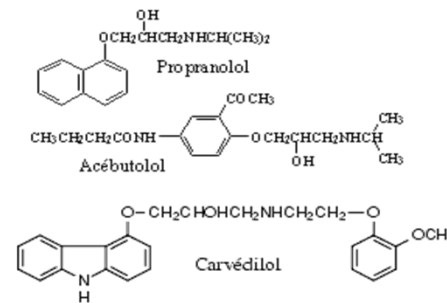
Testing the Theories (1)

- **Schachter and Singer** (1962) tested the theories:
 - Two groups of subjects; both received **epinephrine** (aka- adrenaline, increases arousal)
 - One group told they would feel increased arousal, other group not told
 - Only those not warned of effect reported emotional experience (**supports James-Lange, not Cannon-Bard**)
 - However: **particular emotion experienced could be altered depending on context**
 - Happy confederate = happy subject
 - Angry confederate = angry subject
 - Counter to one idea of James-Lange theory, because arousal was same in both cases
- **The body can trick the brain into “feeling” emotions**

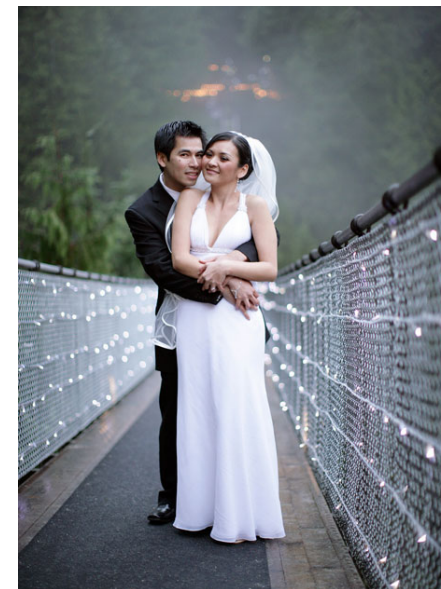


Testing the Theories (2)

- **Beta blockers:** drugs that **block peripheral effect of epinephrine** can reduce acute anxiety (e.g.; stage fright)
 - These drugs block β -receptors in body (cardiac) but do not readily cross blood brain barrier
- **Capilano Suspension Bridge Experiment:** you can trick body without drugs too
 - Male subjects meet a female confederate on suspension bridge (high arousal) or on stone bridge or office (low arousal)
 - Afterwards asked to rate their level of attraction to confederate
 - Those on suspension bridge rated confederate as much more attractive; more likely to ask her out

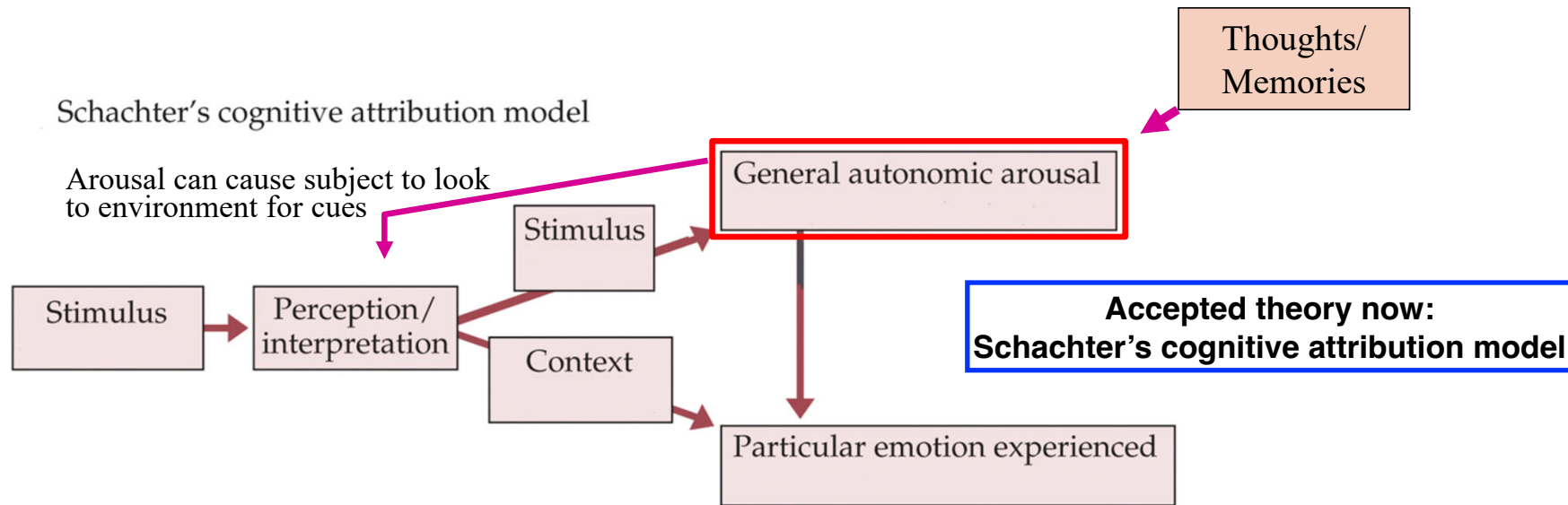


Beta blocking for acute anxiety; not best for long term anxiety (cardiac effects)



We all know this study i hope

Theories of Emotions (3)

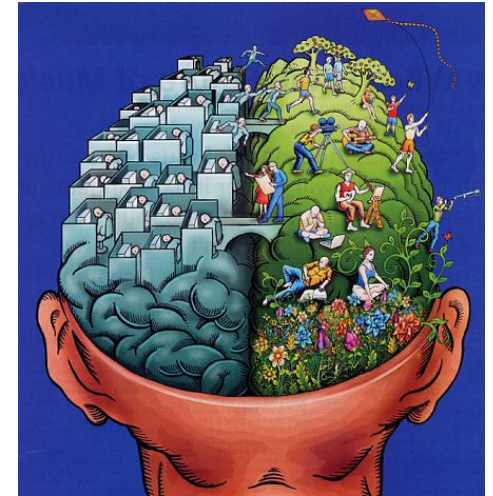


- Modern theory emphasizes reciprocal interactions with all three factors
 - Accounts for most of experimental data
- Original Schachter/Singer theory proposed arousal only adds intensity of emotion, does not distinguish between emotions
- More recent research suggest subtle differences in physiological arousal for emotions like fear and sadness

Left Brain/Right Brain and Emotions

- General perception - right hemisphere more “emotional” vs left hemisphere
- **Both** hemispheres play different roles
 - Left hemisphere stroke damage shows most depressive symptoms; frontal lobes most sensitive
 - Right hemisphere lesions = unduly cheerful
 - Similar effects with unilateral brain inactivation
 - Depressed patients show ↓ activation in left frontal areas
- Facial expressions of emotions emerge sooner, greater magnitude on left side of face (controlled by right hemisphere)
- **Theory:** anterior **left** and **right** hemispheres play more prominent roles in approach and withdrawal processes, respectively
 - Left frontal damage = anhedonia, ↓ initiating behaviour
 - Right frontal damage = ↓ withdrawal behaviour, ↓ negative emotions

Right can be faster
at emotional
response



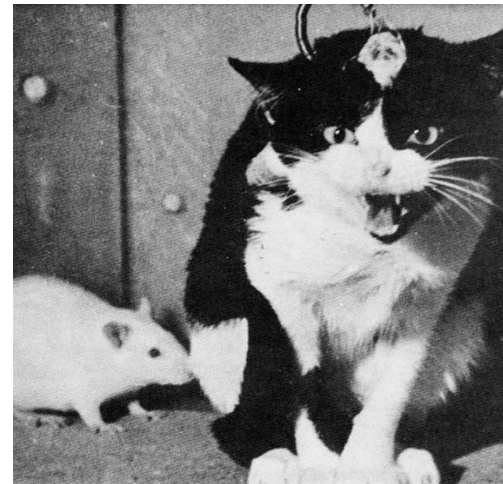
Right = withdrawal behavior
Left = approach behavior

Neural Circuits of Emotions (1)

- **Decorticate/Sham Rage:**

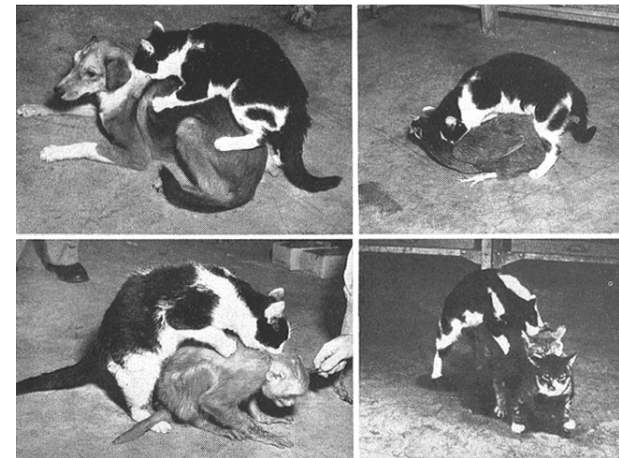
- Remove cortex, animals can burst into sudden undirected fits of intense rage
- Stimulate subcortical regions can also trigger emotional, rage-like effect
- Lesions to certain subcortical regions can reverse effect of cortex removal on sham rage
- **Conclusion:** subcortical structures can regulate some emotions: direction and inhibition of emotions controlled by cortex

Removal of cortex OR stimulate subcortical regions
→ sudden fits of rage
Remove cortex + lesion subcortical regions →
alleviate sham rage



Neural Circuits of Emotions (2)

- **Klüver-Bucy Syndrome:**
 - Removal of temporal lobe in monkeys or other animals caused major alterations in behaviour
 - **Lack of fear**, strong oral tendencies, hypersexuality
 - Subsequent studies revealed damage to the **amygdala** is main temporal lobe region involved in these effects
 - **Conclusion:** the amygdala is one subcortical region that regulates generation of some emotional responses
- Remove temporal lobe (amygdala damage)
→ lack of fear, oral tendencies (PICA-esque), hypersexuality

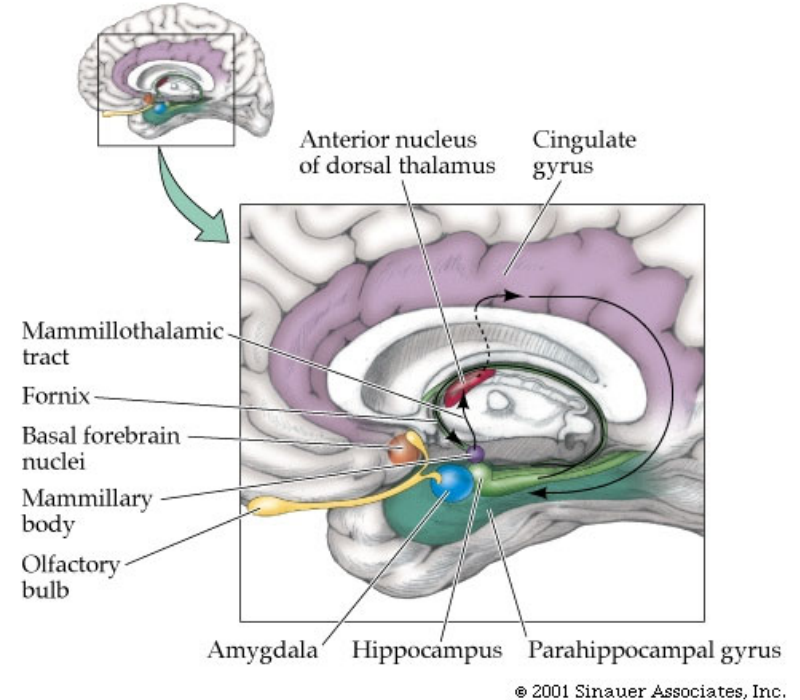


Neural Circuits of Emotions (3)

- Papez assessed brains of patients w/ emotional disorders and rabid animals- found consistent patterns of damage in certain areas (“**Papez’s circuit**”)
- Collectively termed the **LIMBIC SYSTEM**
- In charge of the “four F’s”

➤ **Three big players**

- Hippocampus** = major memory center (temporal lobe)
- Amygdala** = mediates emotional responses (especially fear); both autonomic and behavioural responses (temporal lobe)
- Prefrontal cortex** = integrates inputs from temporal lobes and other regions to co-ordinate appropriate responses (frontal lobes)



Prefrontal Cortex (PFC) and Emotion

- **Orbital/medial PFC damage:**
 - Normal emotional responses to intense stimuli (e.g. pain)
 - Language, motor skills, IQ, unaffected
 - Impoverished (not abolished) affect; patients show (often inappropriate) burst of emotions
 - Inappropriate in social situations
- **Core deficit: impaired emotional regulation**
 - insensitive to emotional consequences of actions *at the time*-inability to view situations from someone else's perspective
 - Primate studies: PFC lesions disrupt social behaviour: ↓ social interaction and dominance, altered social preference, ↓ motor, facial, vocal expressions
 - Psychopaths display reduced PFC activation, may explain lack of guilt/empathy
 - More subtle types of deficits as well (sarcasm, humor)

