

Evolutionary Theories of Emotion

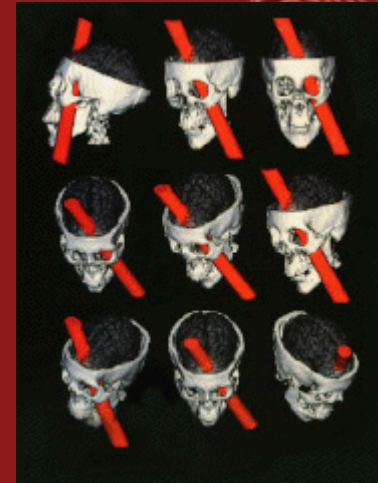


Emotions as Corrupting

- Myth of the Phaedrus: The soul is a chariot drawn by two winged horses
 - White horse: spirit or will
 - Black horse: passions or emotions
 - Charioteer: reason
- If the will follows the dictates of reason, then the chariot flies successfully, but if it follows the passions, it is doomed

Emotions as Essential to Decision Making

- Hume
- The case of Phineas Gage
 - Seemingly recovered physically from his injury, but major changes in personality
 - Gage “was no longer Gage”
 - Damage centered in ventromedial region of frontal cortex bilaterally
- Damasio: patient EVR



Iowa Gambling Task

Start with \$2,000 (facsimile)

Select cards (100) from 1 of 4 decks

Decks A & B

Bad

Large Rewards

\$100

Large Penalties

av. \$125

Decks C & D

Good

Small Rewards

\$50

Small Penalties

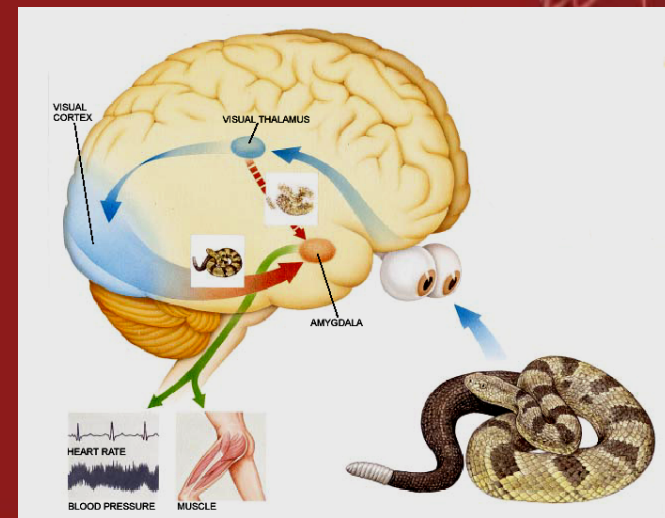
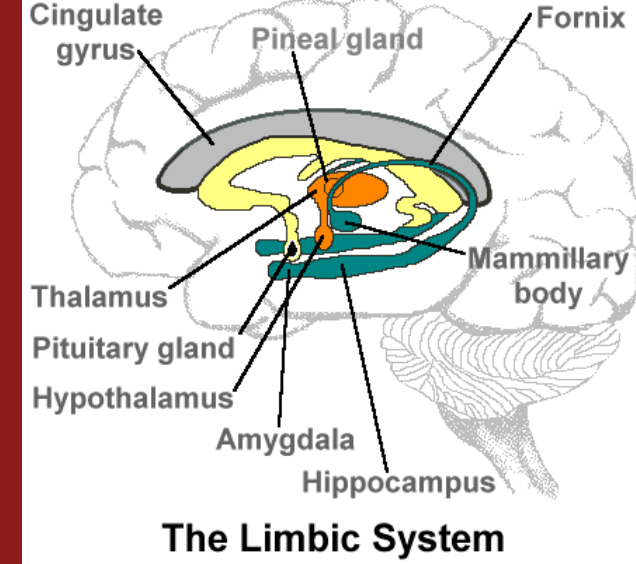
av. \$25

Iowa Gambling Task

- Four stages in normal subjects:
 - Pre-punishment
 - Pre-hunch
 - Hunch (that A and B decks were riskier)
 - Conceptual period (recognized greater losses with A and B)
- EVR and others with orbitofrontal damage never develop the hunches and continue to choose periodically from the bad deck

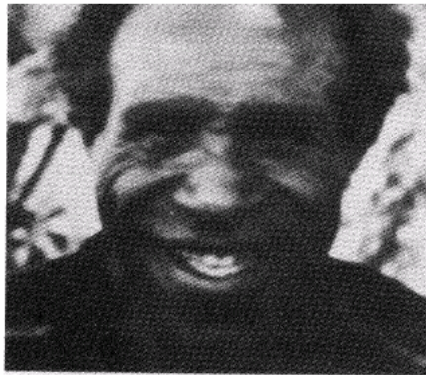
Limbic system

- Amygdala
 - Perceptual inputs
 - Behavioral outputs (both automatic and planned)
 - Involved in fear and threat detection
 - Responds to facial expressions (fear)
 - Patients with bilateral amygdala damage rate even negative faces as being approachable and trustworthy (Adolphs et al 1998)



Ekman: Universal Human Emotions

- Darwin: High interpersonal and intercultural agreement on facial expressions of emotion
- Affect program: evolved behavioral responses



From Ekman
(1972)

Evolutionary Psychology of Emotions

- “An evolutionary perspective leads one to view the mind as a crowded zoo of evolved, domain-specific programs. Each is functionally specialized for solving a different adaptive problem that arose during hominid evolutionary history, such as face recognition, foraging, mate choice, heart rate regulation, sleep management, or predator vigilance, and each is activated by a different set of cues from the environment. . . . A superordinate program is needed that coordinates these components, snapping each into the right configuration at the right time. Emotions are such programs.”

– Cosmides and Tooby, 2000

Evolutionary Psychology

- “Each emotion entrains various other adaptive programs - deactivating some, activating others, and adjusting the modifiable parameters of still others - so that the whole system operates in a particularly harmonious and efficacious way when the individual is confronting certain kinds of triggering conditions or situations.”

Fear response

“When the situation detector signals that one has entered the situation ‘possible stalking and ambush’, the following kinds of mental programs are entrained or modified: (1) There are shifts in perception and attention: You may suddenly hear with far greater clarity sounds that bear on the hypothesis that you are being stalked. . . (2) Goals and motivational weightings change: Safety becomes a far higher priority. . . (3) Information-gathering programs are redirected: Where is my baby? . . . (4) Conceptual frames shift, with the automatic imposition of categories such as "dangerous" or "safe". . . (5) Memory processes are directed to new retrieval tasks: Where was that tree I climbed before? . .

Fear response continued

“(6) Communication processes change [e.g., give alarm call]. . . (7) Specialized inference systems are activated: Information about a lion's trajectory or eye direction might be fed into systems for inferring whether the lion saw you [etc.] (8) Specialized learning systems are activated [e.g.,] fear conditioning indicates . . . (9) Physiology changes: Gastric mucosa turn white as blood leaves the digestive tract; adrenalin spikes; heart rate may go up or down . . . (10) Behavioral decision rules are activated . . . hiding, flight, self-defense, or even tonic immobility.”

– Cosmides and Tooby, 2000

Only game in town?

- Highly plausible that many basic emotional responses are “wired” into our neural circuitry and operate rather automatically
- But this does not require accepting the evolutionary psychologists account
 - This circuitry is probably far more ancient than the Pleistocene
 - Neural circuitry integrated with other circuitry and overall behavioral responses may be modulated