

Introduction to Medical Psychology

Lecture 6: Emotions

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<https://youtu.be/loFdKJdWsxQ>

Lecture video at above link.

Today: Emotion

Emotion

- Basic emotions
- Function of emotions
- Dimensional Approach: Valence \leftrightarrow Arousal
- Correlation of experienced emotions with psychophysiological measures
- Theories of emotion
- Specific emotion: fear/xenophobia

- Measurement of electrodermal activity, facial muscular activity and heart rate

Ekman: Universality of emotional facial expressions

Sadness



Disgust



Surprise

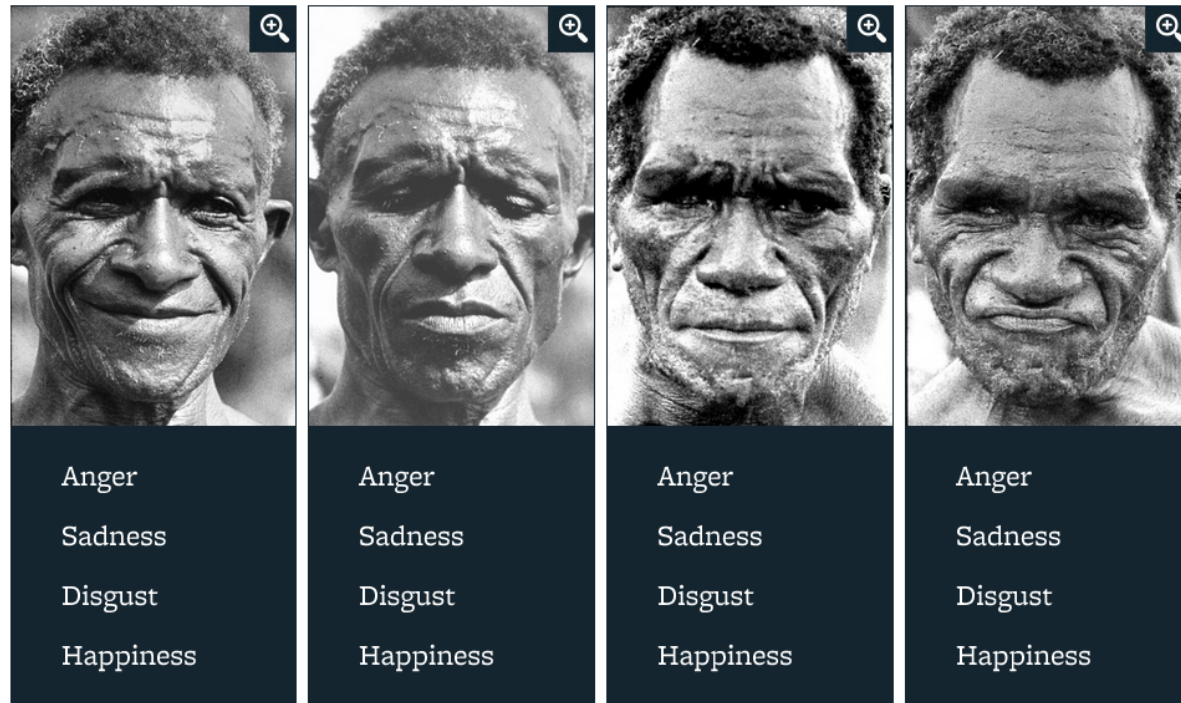


Joy

Fear

Anger

Ekman: Universality of emotional facial expressions

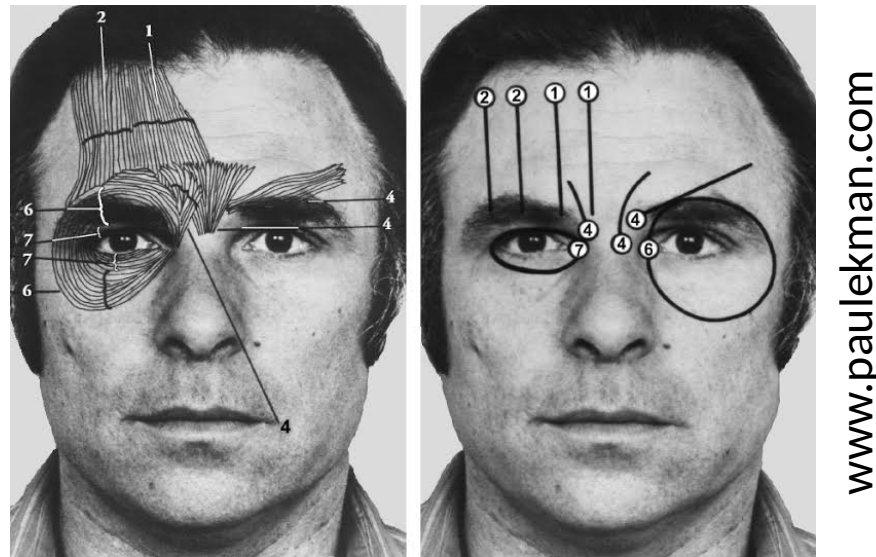


www.paulekman.com

Charles Darwin's had the idea that facial expressions are evolved behaviors for emotional expression. In support of this, Paul Ekman found that the expression of six basic emotions, sadness, disgust, surprise, joy, fear, and anger is universal across cultures (Ekman and Friesen, 1971). Tested were for example Japanese and American subjects or the Fore people in Papua New Guinea.

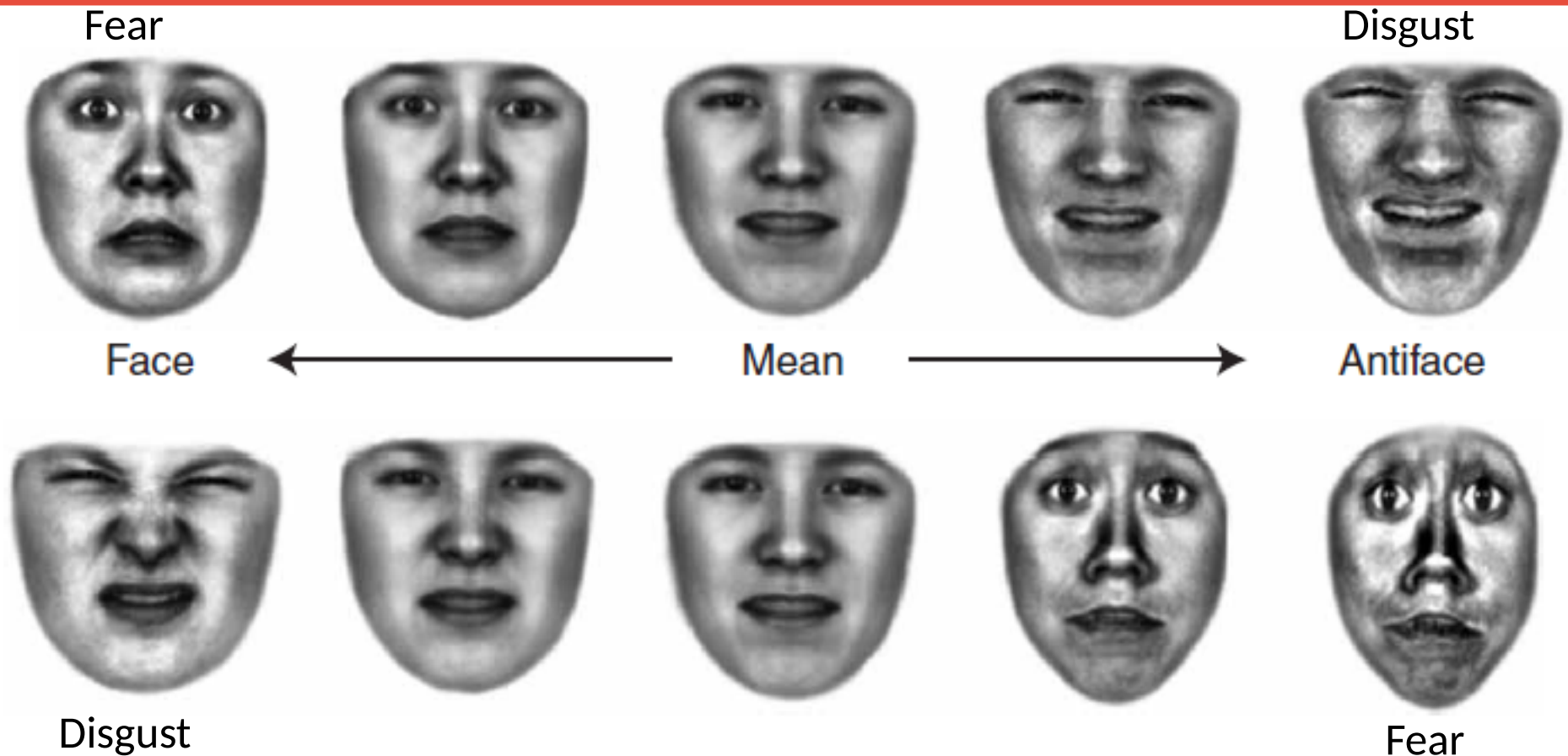
Ekman: Universality of emotional facial expressions

A further idea of Paul Ekman was to code these emotional expressions in a unified coding system, the facial action coding system (FACS).



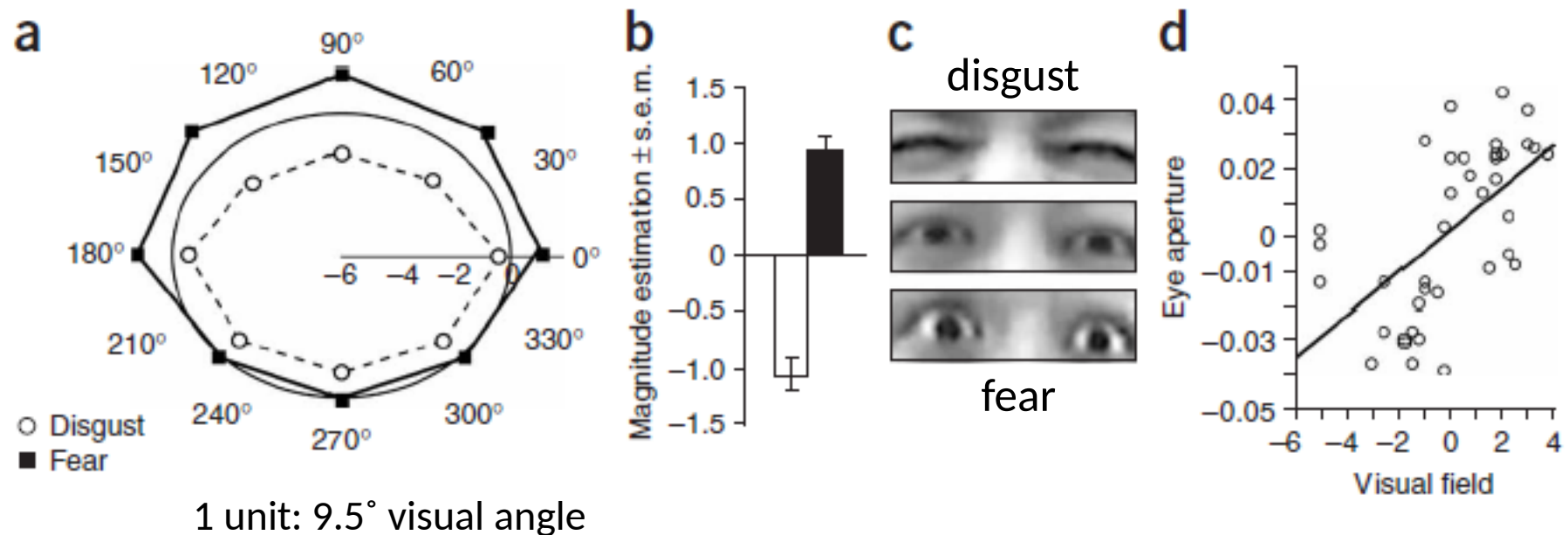
They also suggested that even if people want to hide their true emotions, they still show micro-expressions and muscle activity in the relevant facial muscles.

Survival benefit of emotional facial expressions?



Susskind et al. have investigated the expressions of fear and disgust. They were interested whether these expressions serve to change sensory input, an idea first proposed by Charles Darwin.

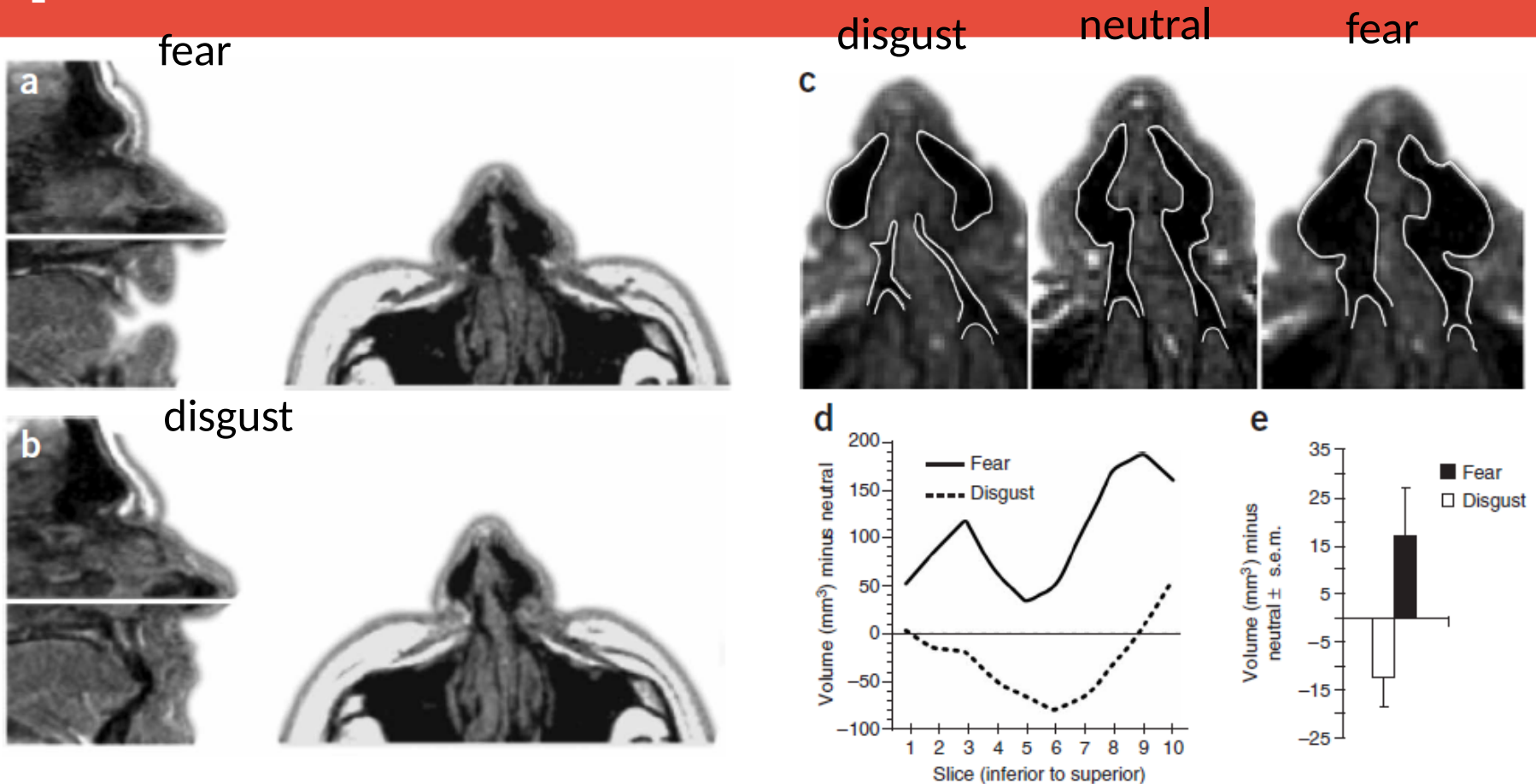
Survival benefit of emotional facial expressions?



During posed fear and disgust, the subjective visual field size was measured (how much of an area could people see).

- Fear resulted in increased visual field size (upper visual field)
- Disgust resulted in decreased visual field size (upper and lower visual field)

Survival benefit of emotional facial expressions?



Magnetic resonance images (MRI) of the nose:

Disgust is related with nose closure (fear widened the nose).

→ Disgust results in smaller uptake of air-borne particles

→ Possibly protection from a poisonous environment

Possible functions of emotions?

Surprise: process new, unexpected information (wide eyes)

Fear: avoid danger, destruction, get distance to threat

Disgust: avoid poisons, waste

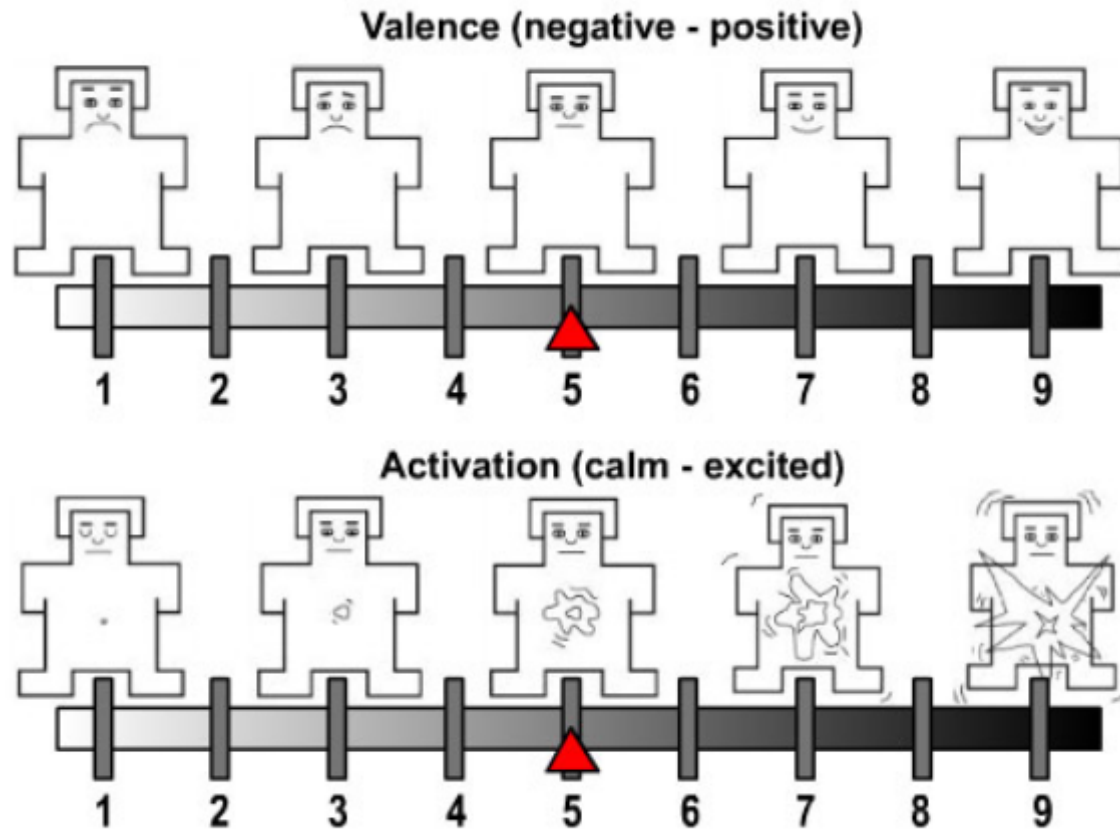
Joy: approach source of joy

Anger: destroy / threaten source of danger

Sadness: withdraw from environment

Emotions and their expression serve important purposes. Besides changing sensory input (enlarging visual fields etc.) they might also send social signals, such as “I’m no threat” by appearing more juvenile during fear.

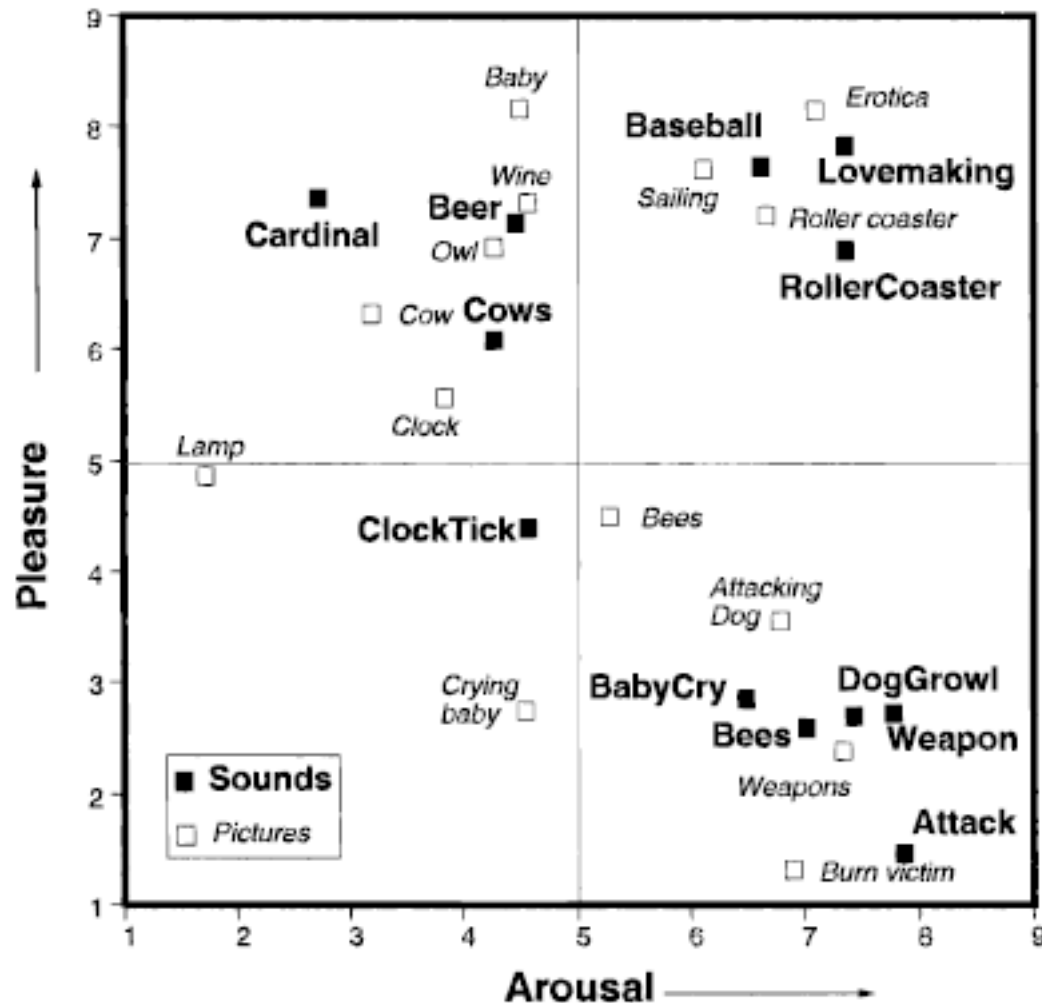
Measuring subjective experience of emotions



SAM= self-assessment manikins

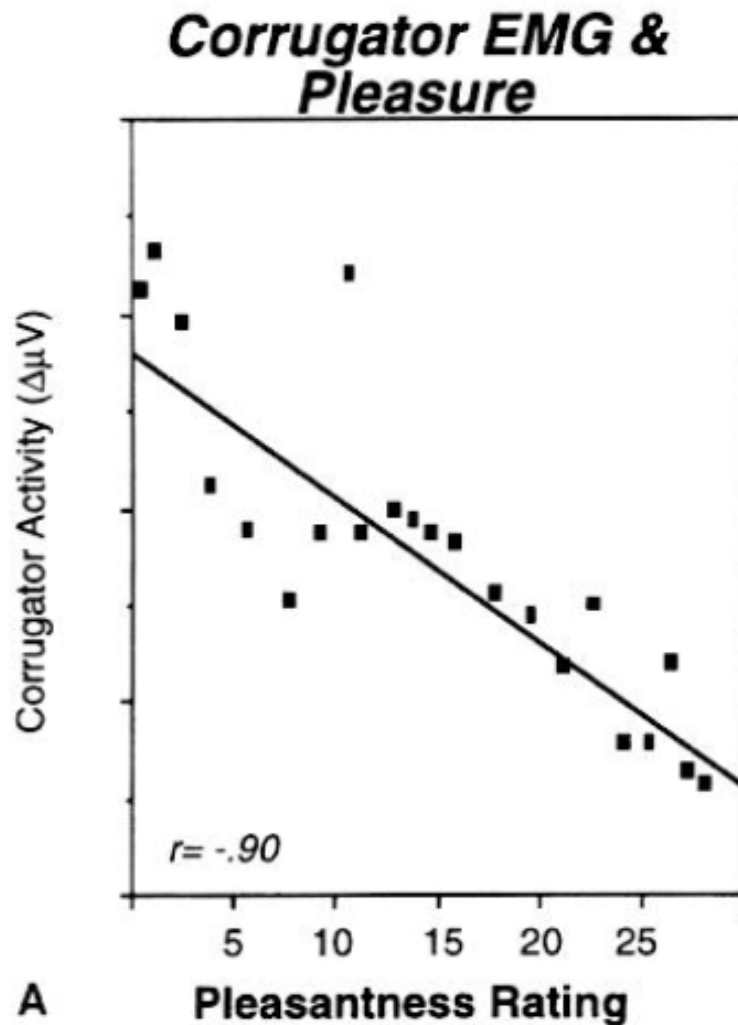
Researchers who are more interested in the experience of emotions (e.g., in a specific situation or when stimulated with pictures/sounds) very often use a continuous approach to emotions (rather than the categorical basic emotions).

Measuring subjective experience of emotions



Here, different sounds were rated according to valence (pleasure) and activation (arousal).

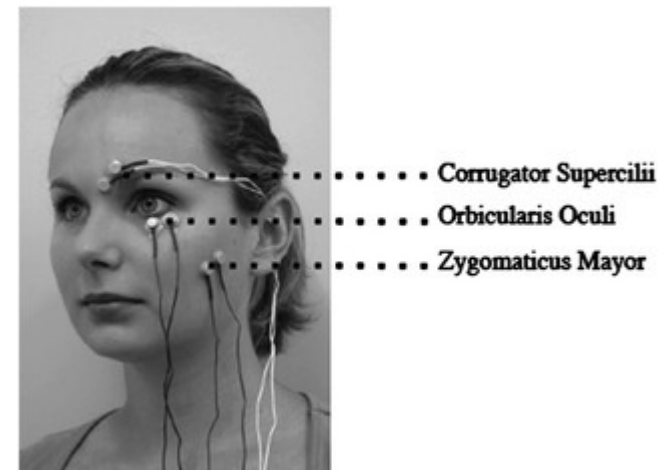
Measuring subjective experience of emotions



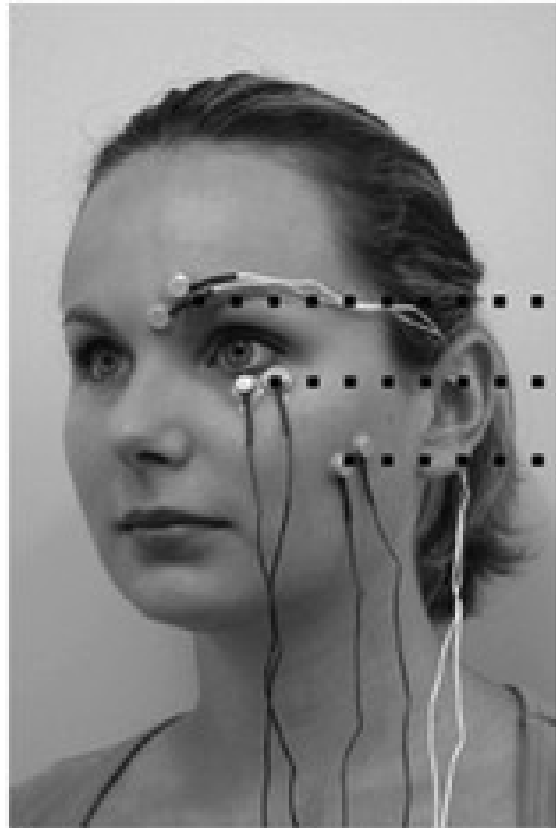
In this case, pictures were rated according to valence (pleasure) and activation (arousal).

Pictures were from the IAPS
International Affective Picture System.

Pleasantness correlated negatively with the activity of the corrugator supercilii muscle (frowning when displeased).



Measuring subjective experience of emotions



Corrugator Supercilii

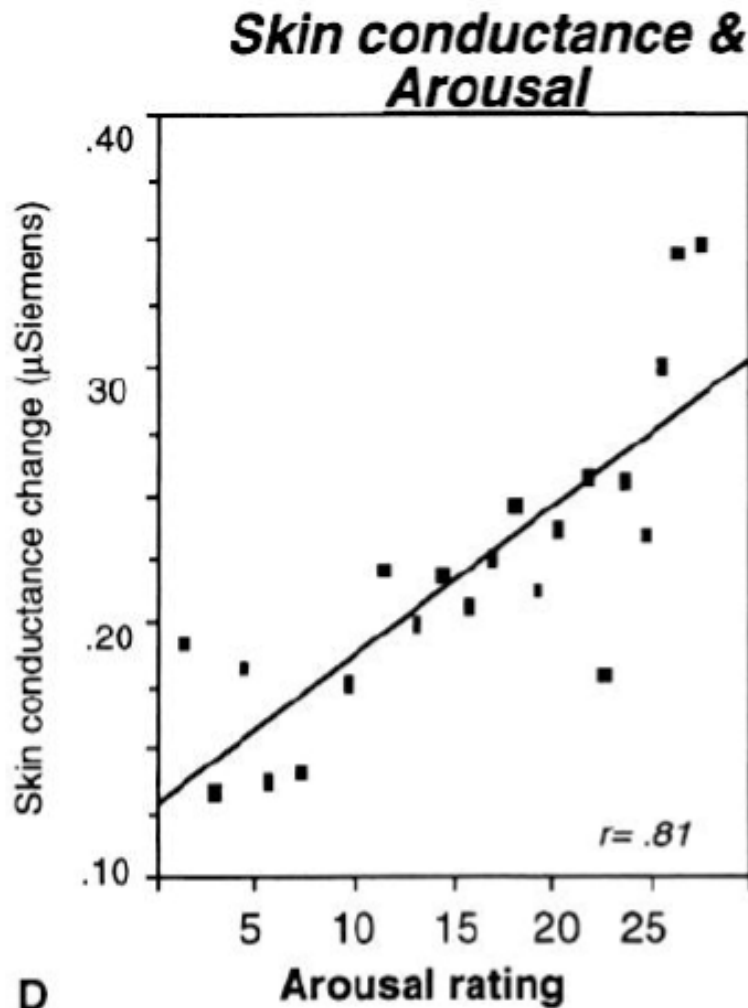
Orbicularis Oculi

Zygomaticus Mayor

Corrugator supercilii: flexed during a frown

Zygomaticus mayor: flexed during smiling

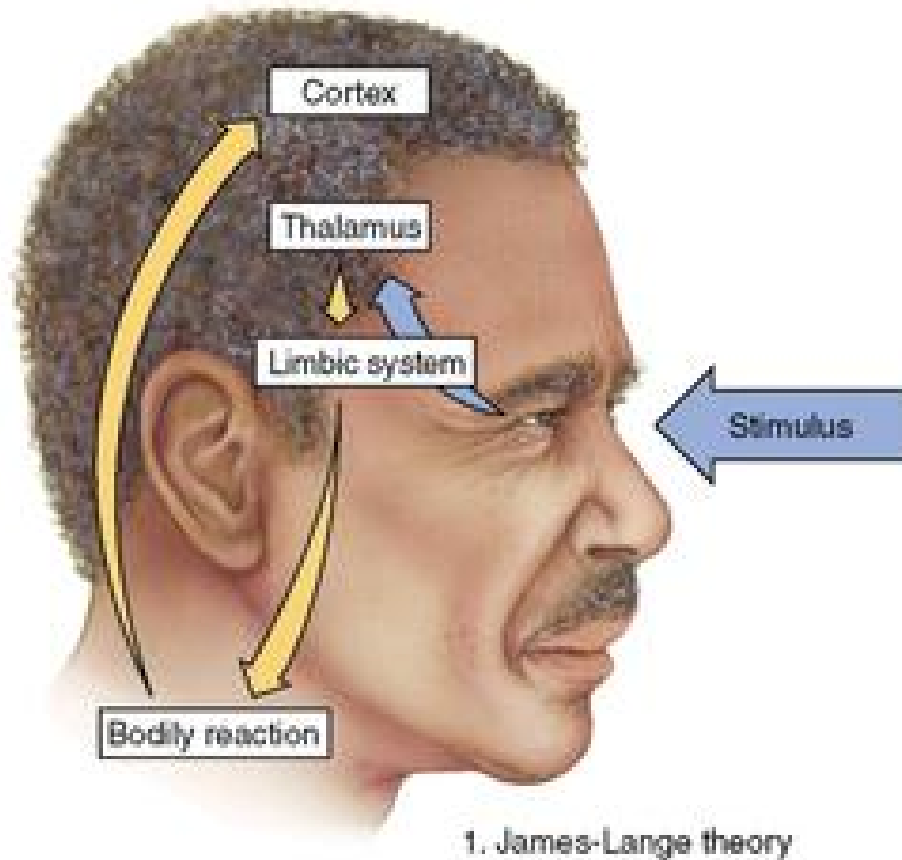
Measuring subjective experience of emotions



Arousal ratings correlated with change of skin conductance.

-> higher skin conductance (more sweat) caused by sympathetic activation for highly arousing stimuli.

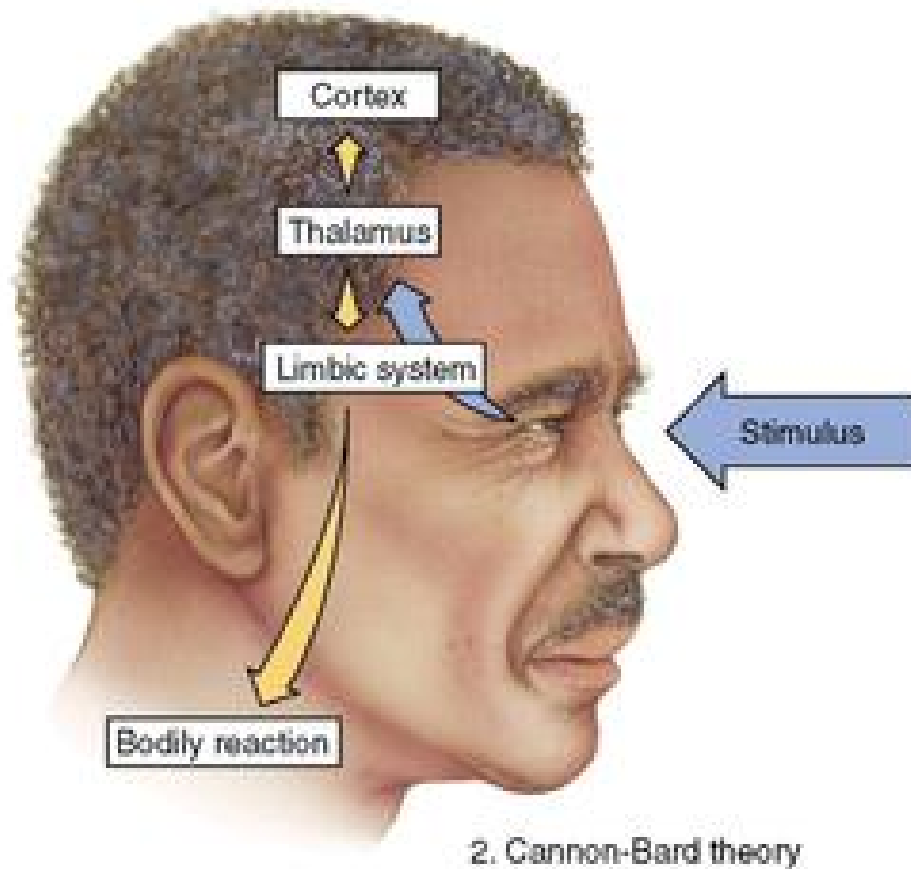
Theories of Emotion



An early theory of emotion suggested by William **James** and Carl **Lange** (James-Lange theory, 1884/1885) suggests that emotions are the experience of bodily reactions in response to emotive stimuli.

Thus, we feel sad because we cry or we feel frightened because we run away and because our heart rate is increased.

Sensory stimulation enters the brain via the thalamus (“sensory hub”) and is transmitted to the limbic system (including the amygdala) which activates bodily reactions. The sensory information relating to the bodily reactions is processed by the cortex and we become aware of our emotion.



Physiologists Walter **Cannon** and Philipp **Bard** challenged the James-Lange theory.

Arguments were that cutting the spinal cord in animals does not lead to a complete removal of emotional behavior. Another argument states that the physiological state (e.g., heart rate, inhibited digestion, and increased sweating) is not a good marker for particular emotions (e.g., anger or fear). So we would not know what to feel.

Sensory stimulation enters the brain via the thalamus (“sensory hub”) and is transmitted to both the limbic system (→ bodily reactions) and cortex (→ conscious processing).

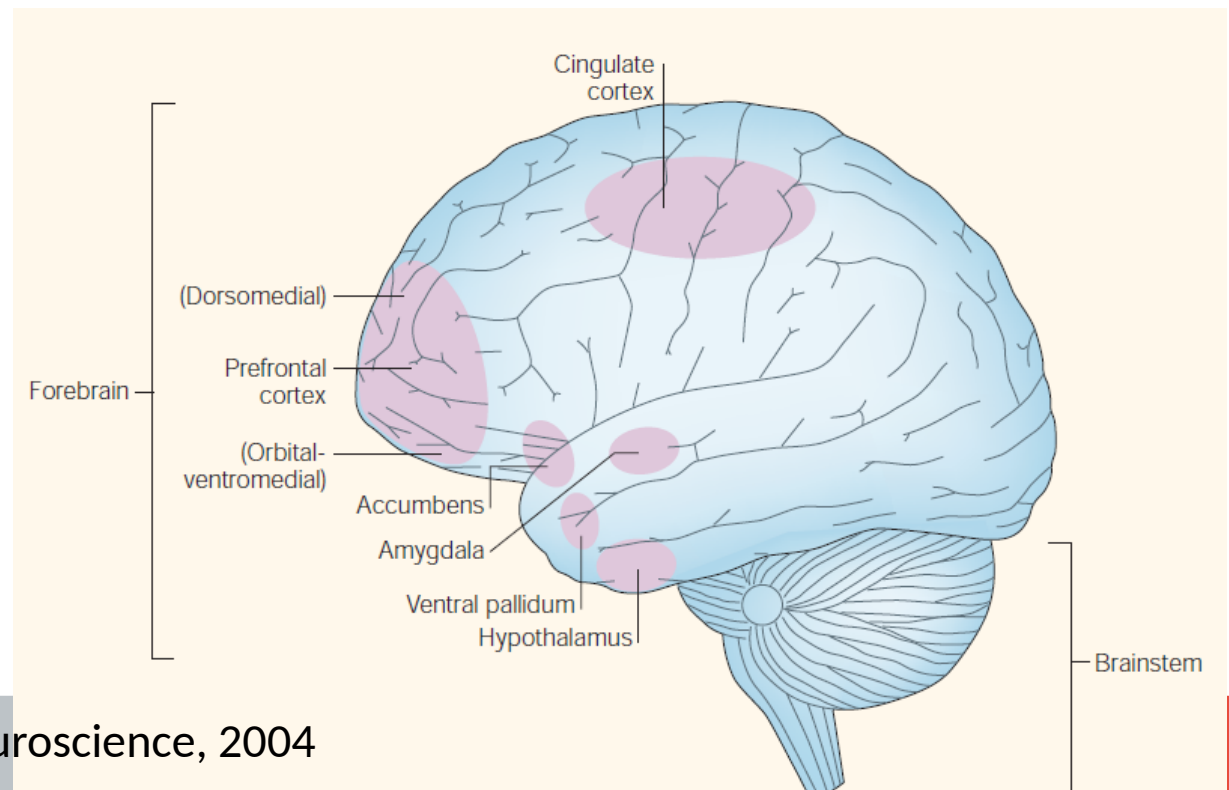
Brain & Emotions

Amygdala (part of the limbic system): processing of fearful stimuli, fear conditioning

Hypothalamus: homeostasis, motivations, control of autonomic response, behavioral response (e.g., aggression)

Prefrontal cortex (PFC): possibly learning of emotional/motivational value or perception of emotional values ('somatic markers')

Anterior cingulate cortex: conscious emotion experience, affect regulation



Emotions and Health

A popular belief based on studies in the 1970s in the UK states that a particular “fighting spirit” improves survival rates for cancer patients (in particular breast cancer). In contrast “helplessness/hopelessness” was supposed to predict poor survival rates.

Recently, a meta-analysis (Petticrew et al., British Journal of Medicine, 2002) showed no difference of survival rates between coping styles (26 studies).

→ “People with cancer should not feel pressured into adopting particular coping styles to improve survival or reduce the risk of recurrence.”

