

EMOTION, STRESS & HEALTH (p.1)

1. Introduction to the Study of Emotion

Darwin, study of evolution of expression of emotion

Emotional expression, like other behaviors, are products of evolutionary selection/factors (e.g. survival of fittest, natural selection)

That emotional expressions evolved from behaviors that signaled what the animal was likely to do next (a form of communication)

That such signals benefited the signaler (and maybe the signal receiver who was a close relative of the signaler)

That very clear signals were of greater benefit than ambiguous ones...

and hence that “opposite” emotions (e.g. fear and aggression) were composed of very different (“opposite”) behaviors (so that they would never be mistaken for each other)

Early studies of emotional expression **in humans**

James-Lange theory: “I am crying so I must be feeling sad”

That cognitive perception of loss --- autonomic & somatic responses --- feelings

Cannon-Bard theory: That cognitive perception of loss --- leads to both autonomic/somatic responses and the feelings of sadness simultaneously

How it appears of most people”: The cognitive perception of loss --- feeling of sadness --- autonomic/somatic responses (“I feel sad, so I cry”)

modern biopsychology view: that cognitive perception (frontal lobes), feelings of emotion (limbic system* & frontal lobes), and autonomic/somatic behaviors (limbic system, hypothalamus, somatic & autonomic NSs) **all interact with each other**, not a linear relationship

*amygdala, mammillary bodies, hippocampus, fornix, cingulate gyrus, septum, olfactory bulbs, & hypothalamus

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e.g. **Kluver-Bucy Syndrome**

damage to anterior tips of temporal lobes (esp. amygdala)
hyperorality (indiscriminate eating)
hypersexual (indiscriminate mating)
repeatedly explore/investigate what should be familiar objects (esp. orally)
total lack of fear, extreme tameness (altered dominance hierarchy)

2. Emotions and Autonomic Nervous System

Are different emotions (e.g. sadness vs. fear) associated with the same or different ANS responses?

James-Lange theory predicts **different, unique ANS responses**

Cannon-Bard theory predicts all emotions are associated with the **same general ANS arousal pattern** that prepares the S for action

This question has been very difficult to answer experimentally...why?

The evidence seems to indicate that the answer lies in the middle, some specificity + some generality; some individual differences + some across individual generalities

e.g. **role of ANS responses in “Lie Detection”/Polygraphy**

record HR, GSR, breathing rate, etc.

assumption: when S tells a lie that ANS responses will show greater emotional arousal

test results run by a skilled examiner can be useful, but they are far from infallible (& are still, thus, inadmissible in a court of law)

Why?...

Control question technique (control questions vs. target questions)

In mock-crime studies, the average success rate is about 80%

Guilty knowledge technique (control questions vs. specific information questions that only the guilty party would know about)

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3. Emotions & Facial Expressions

As Darwin predicted, people of different cultures do indeed make very similar facial expressions in similar situations/expressing similar emotions & can thus correctly identify different emotions via facial expression in others (even in strangers from other cultures, races, sex, ages, etc.)

Research indicates that there are **at least six “primary” emotions** expressed via facial expression: surprise/startle, anger/aggression, sadness, disgust, fear/anxiety, and happiness

There is evidence that what facial expression you display can influence your emotional tone/experience...so be careful how your face looks...put on a “happy face” to feel happier

Detection of “false” emotions or lies via facial expressions

Ekman, 1985, “microexpressions” that last 5/100th of a second, express the S’s true emotion, break through the false expression, can be detected by skilled observers

Note: people in conversations with one another tend to mimic each other’s facial expressions, even though are not usually consciously aware of this and even if they are not aware of what the other person’s facial expression was

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4. Stress & Health

All stressors (stimuli/situations that S considers a threat), whether psychological or physical elicit a **similar core physiological responses**

These physiological responses are of themselves not harmful to one's health as long as they occur briefly, in acute situations

In fact, these responses are adaptive and have positive survival value

But...if these responses occur for long periods of time, become **chronic**, then they can harm one's health

Why are they chronic? The environment? The person?

The Stress Resonse (Selye)

Hypothalamic - Anterior pituitary - Adrenal cortex system
(CRF) (ACTH) (glucocorticoids)

high levels of glucocorticoids in the blood stream are used as an important measure of "stress"

associated with **depression**, with **impaired immune system** function, increased **ulcers** in GI tract, **lower levels of testosterone** (e.g. as seen in cases of "subordination stress" in males)

The SNS Stress Response

Hypothalamic – Sympathetic NS – Adrenal medulla system
(epinephrine & nor-epi)

associated with high **cardiovascular reactivity**, **HBP**

associated with **anger, rage, hostility**

both of these stress responses if chronic can lead to physical illnesses and to psychological problems

e.g. Ss showing more stress before surgery recovery more slowly

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5. Psychoneuroimmunology: Stress, the Immune System & the Brain

Stress can reduce a person's resistance to infection

Stress reduces the IS's ability to function (e.g. fewer T cells, fewer B cells, Fewer NKCs)

Many events can --- lowered IS function

e.g. **inescapable, unpredictable** electric shock or loud noise

repeated social defeats

overcrowding

the odor of stressed conspecifics

maternal separation....all in animal models

final examinations

chronic sleep deprivation

divorce

bereavement

caring for a relative with Alzheimer's disease (severe chronic illness)...

all in humans

"learned helplessness" (& depression)

"mastery training" & improved IS functioning

sense of **control** over adverse events, sense of **resources** at one's disposal

attribution theory (Seligman)

note: T & B lymphocytes both have RSs for glucocorticoids

these cells also release neuropeptides

cytokines are released by both neurons and by lymphocytes

(thus, **close relationships/communications between NS and IS**)

note: **stress & the hippocampus**

hippocampal neurons have very high # of glucocorticoid RSs

high stress levels (even only a few hours) --- structural changes in

hippocampal neurons (e.g. dendrite shrinking, decreased neurogenesis, increased neuron loss)...esp. in males

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6. Fear & the Amygdala

amygdala is made up of many subregions/nuclei

the “amygdaloid complex”

amygdala receives inputs from all sensory systems

seems to “analyze” the emotional significance of each sensory stimulus

and to learn/retain that information

seems to be the neural basis of fear, anxiety, “panic attacks”

amygdala --- PAG (periaqueductal gray) --- defensive responses/postures

amygdala --- hypothalamus --- SNS responses

if amygdala is destroyed --- S cannot exhibit any learned fear conditioning

e.g. **Urbach-Wiethe disease** – progressive calcification of amygdala

loss of ability to recognize the facial expression of fear

cannot describe fear-inducing situations

cannot draw fearful facial expressions