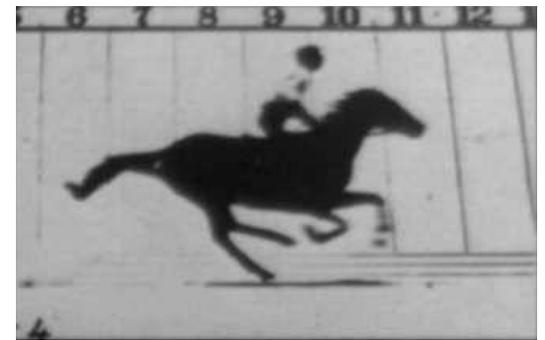
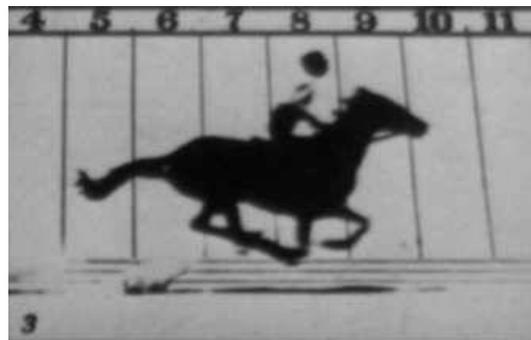
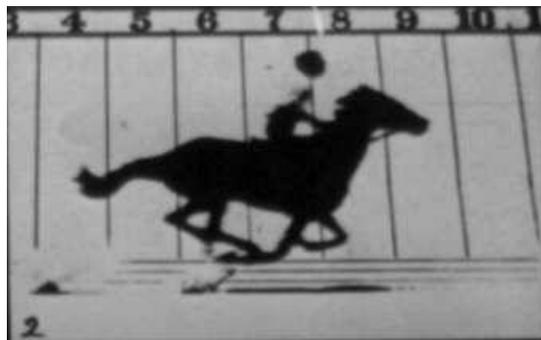
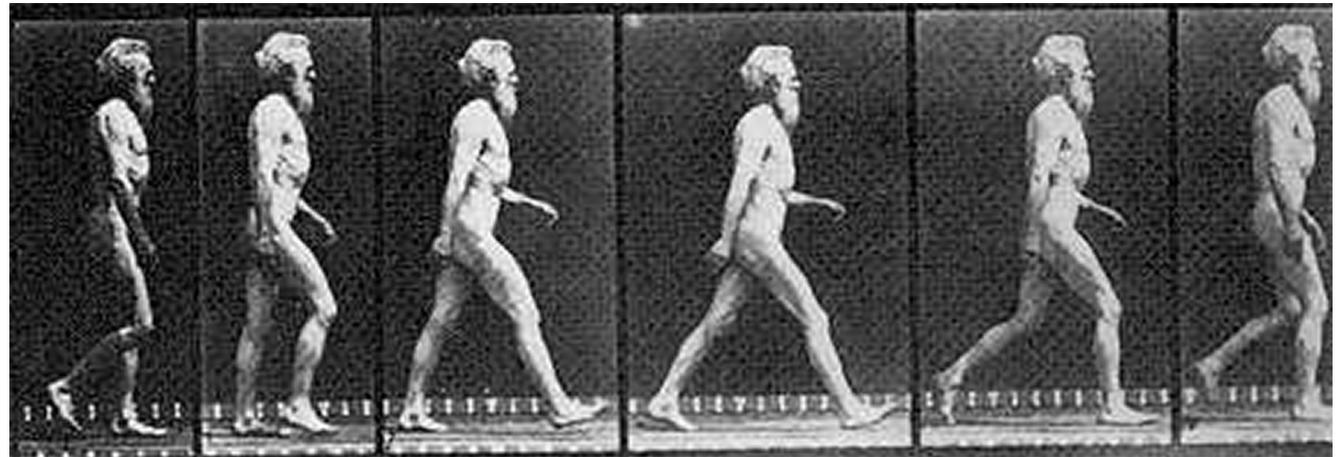
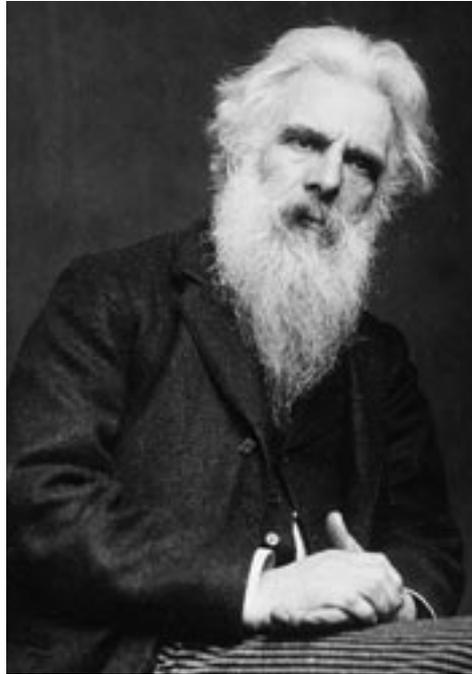
A humanoid robot with a white, glossy face and a complex mechanical body. The robot is holding a red tomato in its right hand. The background is dark, and the robot's face has a slight smile and rosy cheeks.

Emotions and Cognition

Catarina Moreira

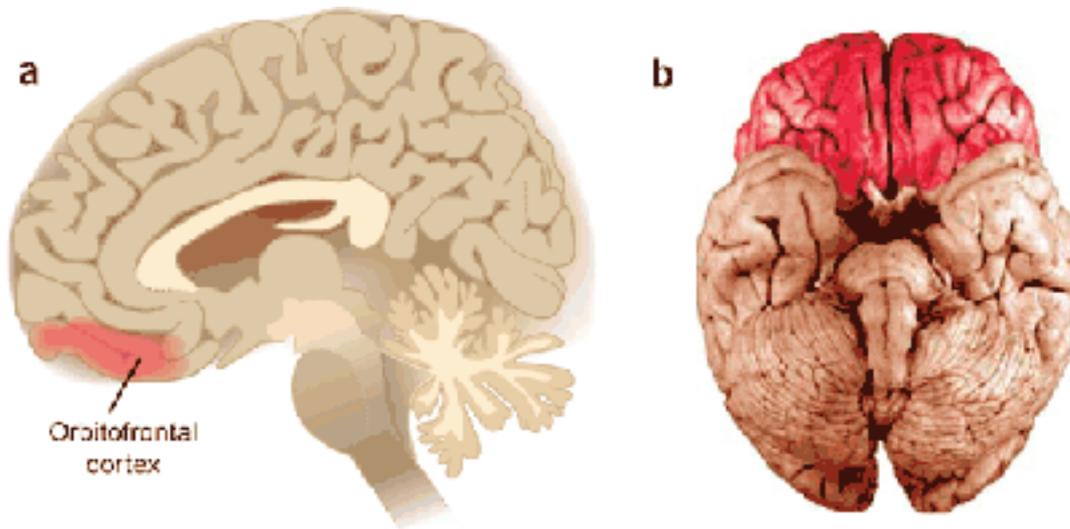
Instituto Superior Técnico,
Technical University of Lisbon / GAIPS

Eadweard Muybridge



Passion and Reason

- Muybridge's orbitofrontal Cortex was affected;



- Without **emotions**, people become no longer **rational!**



Passion and Reason

“Our emotions need to be in working order in relation to each other so that they may guide our **reasoning** and **action** wisely”



Passion and Reason

- Emotions influence reasoning!
- **Stoics:** to lead a good life, emotions should be eradicated.
- **Philosophers:** emotions are less sophisticated, more primitive ways of perceiving the world, especially when juxtaposed with loftier forms of reason.



Passion and Reason

- Two points of view:
 - Human society is better off when the more primitive passions are reigned in by traditional thought.
 - Reason is and ought only to be the slave of the passions and can never pretend to any other office than to serve and obey them (David Hume).

Passion and Reason

What do you think of this?

“Reason is and ought only to be the slave of the passions and can never pretend to any other office than to serve and obey them (David Hume)”





Passion and Reason

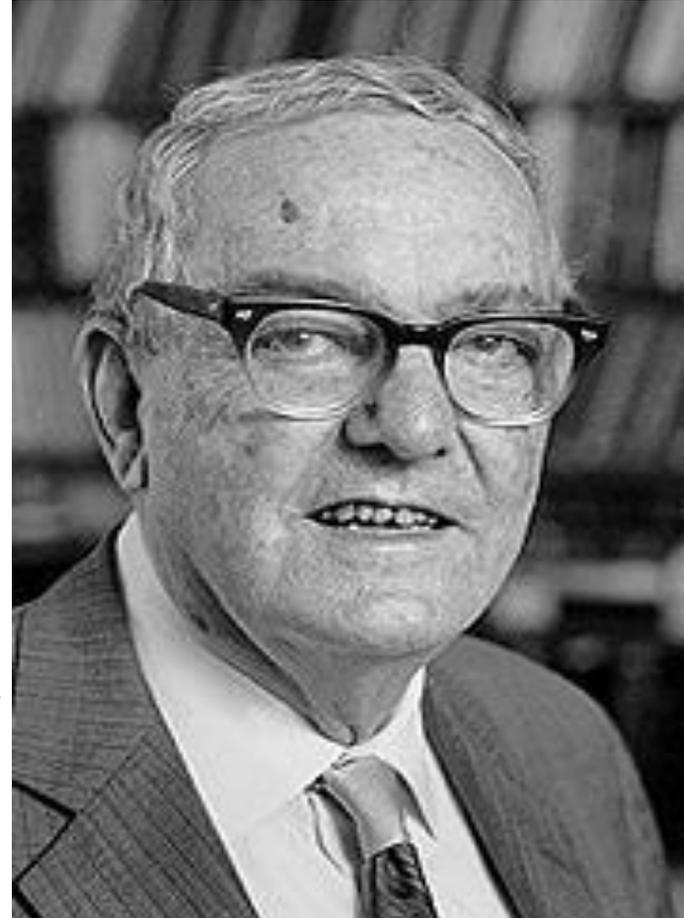
- Three meanings when considering emotions rational:
 1. Emotions are based on **substantive beliefs**: do beliefs and appraisals that support our emotions correspond to the actual world?
 2. Emotions help individuals **function effectively** in the social world.
 3. Do emotions guide perception, attention, memory and judgment in principled, organized and constructive ways? Or do they interfere with and disrupt cognitive processes?

Emotions Prioritize Thoughts, Goals, and Actions

- Emotions guide cognitive processes in an adaptive fashion.
- Cognitive science: “if you had to design a mind, what problems would you have to face and what principles would you need to embody?”

Emotions Prioritize Thoughts, Goals, and Actions

- Emotions are necessary in any intelligent being.
- They set priorities among the very many goals that impinge upon individuals at any moment.



Herbert Simon

Emotions Prioritize Thoughts, Goals, and Actions

Simple organisms



Humans



God



Scale of Complexity

Controlled by Reflexes

No need for emotions.

- **Limitations of knowledge**
- **Sometimes need encouragement**
- **Don't know how to react to many events**

Need Emotions!

Everything is known and anticipated

No need for emotions.

Emotions Prioritize Thoughts, Goals, and Actions

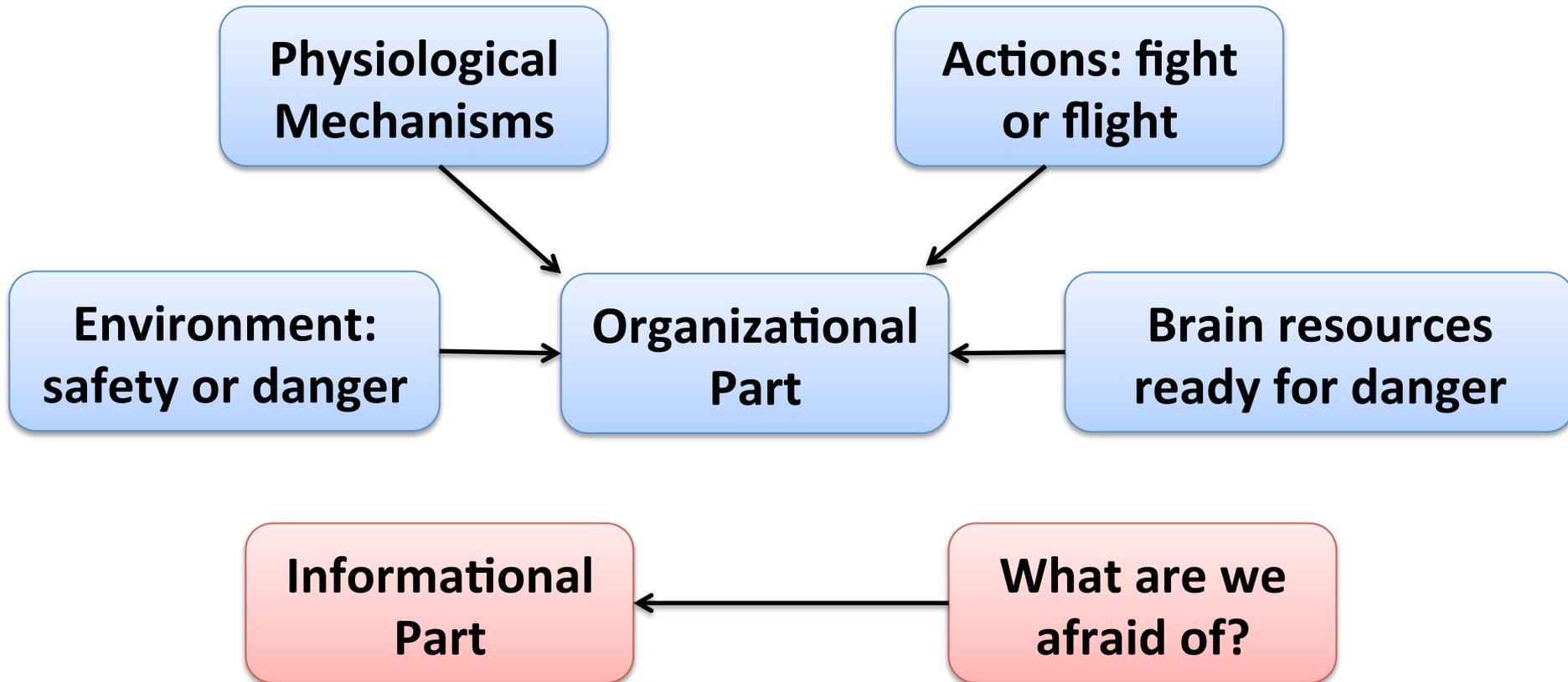
- Emotions are important for any complex being
- They guide action in a world that is always imperfectly known and can never be fully controlled.
- Emotions are bridges towards **rationality!**

Emotions Prioritize Thoughts, Goals, and Actions

- Emotions evolve in two kinds of signaling:
 - **Primary appraisal:** it is organizational. Carries no information about objects in environment.
 - **Secondary appraisal:** it is informal. Carries information that enables the mental modeling of events, their possible causes and implications.

Emotions Prioritize Thoughts, Goals, and Actions

- **Example.** Consider the emotion **fear**.





Perspectives on Emotions in Cognitive Functioning

**How do emotions guide through
processes?**

Emotions Prioritize Thoughts, Goals, and Actions

- Emotion Congruence
- Feelings as Information
- Styles of Processing

Emotion Congruence

- G. Bower: **moods** and **emotions** are based in associative brain networks.
- Pathways are devoted to each emotion in a **semantic network**
- When experiencing an emotion, all the associations of that emotion become accessible





Emotion Congruence

- **G. Bower's congruence:** people who are feeling happy tend to remember more positive facts. People who are sad tend to remember negative facts.
- **Parrot & Spackman incongruence:** Sometimes memories that are incongruent with mood may be recalled better than congruent facts.

Emotion Congruence

The Affect Infusion Model (Joseph Forgas)

- Attempts to explain how **mood** affects one's ability to **process information**
- Emotions infuse into a cognitive task and are more likely to **influence memory** and **judgment**, particularly if the task is complex.



Feeling as Information

- Emotions can be informative when making judgments.
- They can either give us a **signal** (ex. Anger == injustice)
- Many of our judgments are too complex to enable us to review all the **relevant evidence** (satisfaction about a leader <- policies, health, unemployment...)



Feeling as Information

Emotions are **heuristics**, guesses that often work better than chance: shortcuts to making judgments or taking actions

Feeling as Information

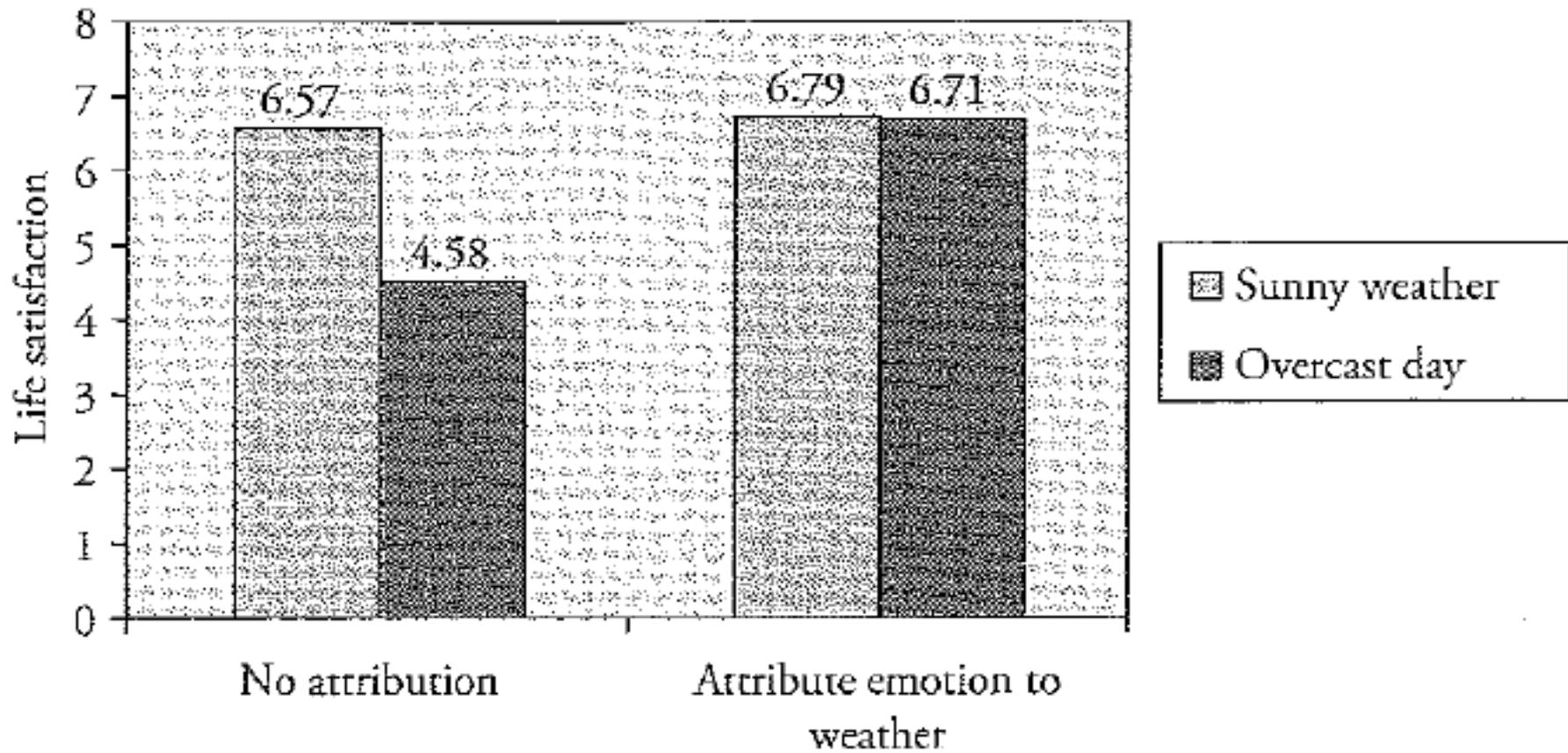
Experiment:

- All things considered, how (dis)satisfied with your life these days?



- How's the weather down there? How (dis)satisfied with your life these days?

Feeling as Information



Feeling as Information

- Participants who were asked about the weather were less likely to be influenced by feelings that had been affected by the weather as they made their judgments of life satisfaction.
- People often use their emotions as heuristics in making judgments, but not when they can attribute those feelings to a specific source.



Feeling as Information

When in a positive or negative emotional state, feelings are likely to affect judgments, even when the objects being judged have no relation to the cause of the emotion

Styles of Processing

- Different emotions and moods promote different styles of processing (D. Kahneman):
 - **System 1:** fast, involuntary, heuristic
 - **System 2:** slowly and deliberative



Styles of Processing

What emotions are associated with System 1 System 2?





Styles of Processing

- **Positive moods** tend to facilitate the use of System 1 (heuristics)
- **Anxious moods** facilitate System 2 (deliberative thought) and facilitate careful attention to details.



Styles of Processing

- If people feel **sad**, they are more likely to deliberate more.
- If people feel **angry**, they are more likely to use heuristics.

Styles of Processing

Positive emotions **broaden** and **build** our resources. Enable more **creative** thought and aid formation of important **bonds** (B. Fredrickson).



Styles of Processing

Positive emotions help us build **interpersonal resources** by motivating us to approach others, to cooperate, and to express affection (B. Fredrickson).



Effects of Moods and Emotions on Cognitive Functioning

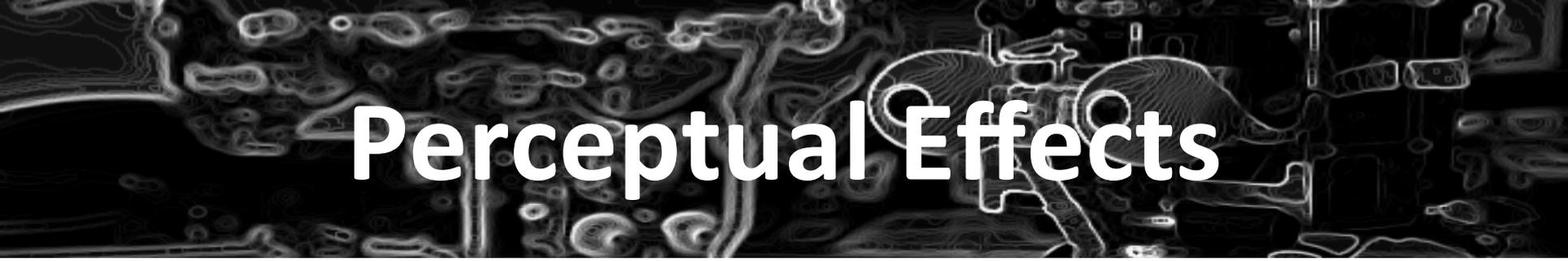
The influence of emotions and moods on perception, attention, memory, judgment, and decision making

- Perceptual Effects
- Attentional Effects
- Effects on Remembering
- ...



Perceptual Effects

- Moods and emotions influence our perceptions!
- Are we attuned to perceiving things that are congruent with our mood?
 - When **happy**, people recognized more **happy words**
 - When **sad**, they recognized more sad words
 - The effects of happy/sad did not extend to positive or negative words that were unrelated to happy / sad emotions (Niedenthal & Setterlund, 1994)



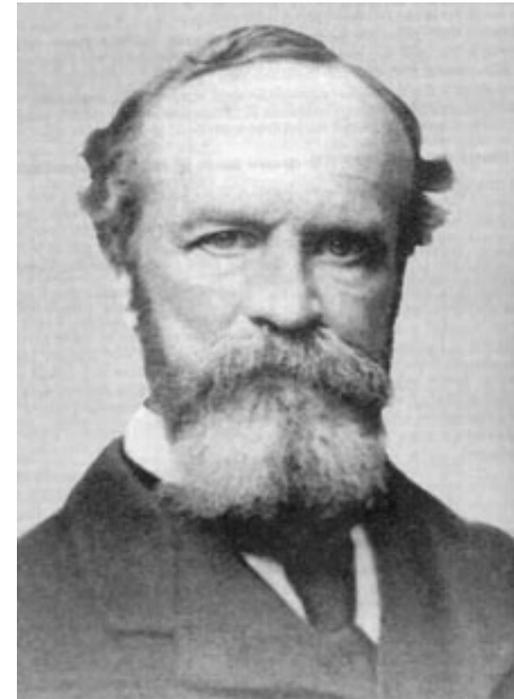
Perceptual Effects

- Our current moods and feelings lead us selectively to perceive emotion-congruent objects and events.
- This in part helps explain why emotions and moods can persist: because built into our experience is a tendency to perceive emotion-congruent objects and events, thus prolonging our experience.

Attentional Effects

My experience is what I agree to attend to.
It is also what we attend to even when we
do not consciously agree to it.

Emotions affect attention. The effects
range from largely unconscious processes
of filtering incoming information to
conscious preoccupation (William James)



Attentional Effects

- Anxiety narrows attention.
- Anxiety can come to monopolize processing capacities and even whole lives.





Attentional Effects

An important implication of attention is that its effects of **emotional prioritization** enable us to concentrate on just those events and objects that are relevant to what we are doing.



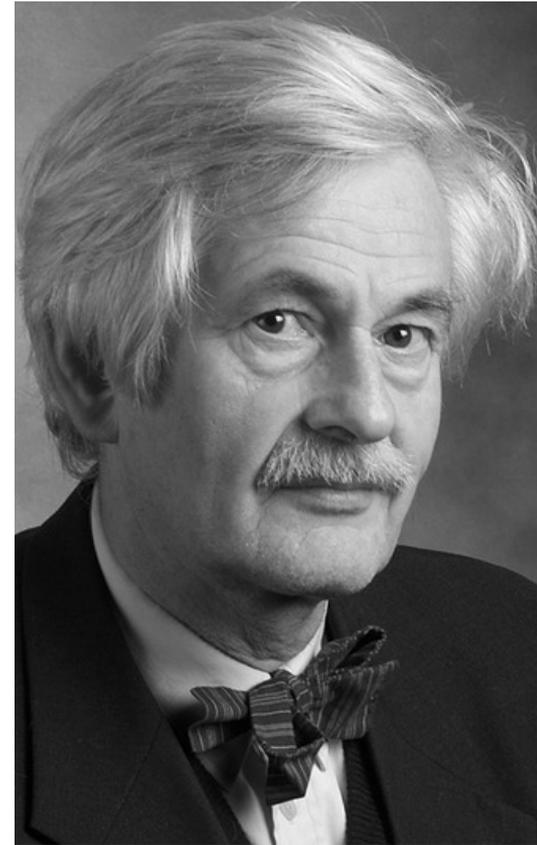
Attentional Effects

Optimistic people maintain our optimism by being biased to focus on positive rather than negative events in the future.

Effects on Remembering

How accurate are memories?

- Wagenaar (1986) recorded an event every day for 4 years;
- Rated the event in three scales:
 - **Salience** (how frequent);
 - **Emotional** involvement;
 - **pleasantness**;

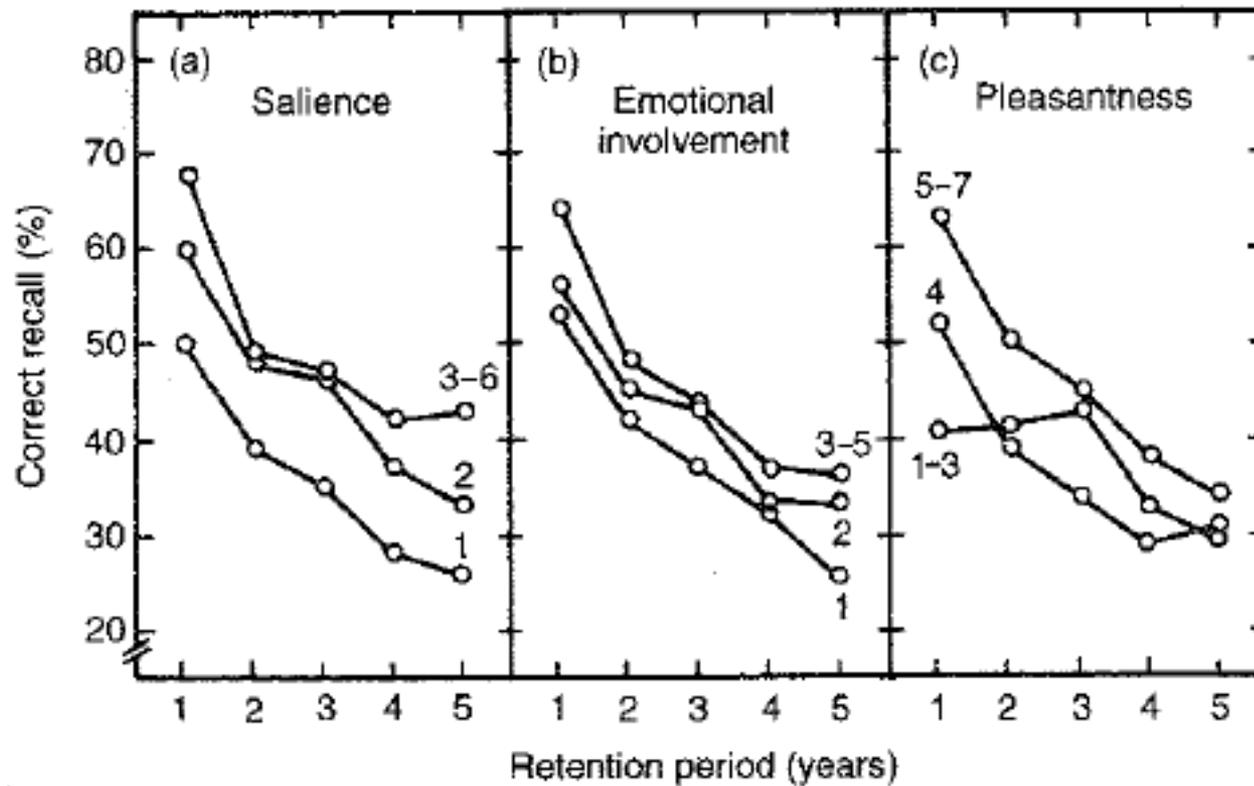




Effects on Remembering

- Over a period of five years, the numbers of events completely forgotten were about 20%.
- Most events could not be remembered in all their details and recall deteriorated over time.

Effects on Remembering



Eyewitness Testimony

What if you were an eyewitness to a crime? How would your memory for the event be affected?



Eyewitness Testimony

- Eyewitness testimony is often mistaken
- Stressed victims are more accurate than non-stressed victims.
- Accuracy of remembering increases for events that are emotionally involving.
- We are better able to recall events that were emotionally intense for us



Persuasion

- Related to congruence.
- Sad people changed their attitudes toward raising taxes with the sadness-framed message
- Emotions can affect persuasion in a different way by influencing the confidence people have in their thoughts



Moral Judgment

- Emotions act as guides to moral judgment, that is, to judgments about right and wrong and about character and virtue
- Emotions are bases for social life!
- Act as social-moral intuitions and amplify moral judgments



Moral Judgment

Fast, automatic experiences of specific emotions provide intuitions of right and wrong, virtue, and punishment without elaborate calculation at the conscious level!



Moral Judgment

- Emotions act as guides to moral judgment, that is, to judgments about right and wrong and about character and virtue
- Emotions are bases for social life!
- Act as social-moral intuitions and amplify moral judgments