Cognition and Emotion Basics

Week 2 – Class 1
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Utrecht University
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Topics

1. Introduction to Cognitive Psychology

1. Introduction to Theories of Emotion
Cognitive psychology

Cognition occupies a major portion of human psychology.

Cognition (mental activity) describes the acquisition, storage, transformation and use of knowledge.

Cognitive psychology:
  – Cognition
  – Cognitive approach; theoretical orientation that emphasizes people’s thought processes and their knowledge

Widespread influence on
• other areas of psychology
• disciplines outside psychology.

Important to understand the “human” in human computer interaction.
History of Cognitive Psychology (1)

Aristotle
384-322 BC

Perception, memory, mental imagery

Acquiring knowledge through experience and observation;

Emphasis on empirical evidence: scientific evidence obtained by careful observation and experimentation.
History of Cognitive Psychology (2)

Wilhelm Wundt, “founder” of psychology
1832 – 1920
Study mental processes through introspection (analyze own sensations), report objectively under standardized conditions.

Hermann Ebbinghaus
1805-1909
Mary Calkins
1863 - 1930

Studies of human memory

Study how people use cognitive processes in real world
History of Cognitive Psychology (3)

William James
1842 – 1910
Interest in everyday psychological experiences. Human mind is active and inquiring. Introduced many topics still relevant for research.

Behaviorism
1st half 20th century

Psychology must focus on objective, observable reactions to stimuli in the environment, rather than introspection
• Operational definition (precise definition how a concept is to be measured)
• Controlled research

John Watson
History of Cognitive Psychology (4)

Watson believed that all individual differences in behavior were due to different experiences of learning:

"Give me a dozen healthy infants, well-formed, and my own specified world to bring them up in and I'll guarantee to take any one at random and train him to become any type of specialist I might select - doctor, lawyer, artist, merchant-chief and, yes, even beggar-man and thief, regardless of his talents, penchants, tendencies, abilities, vocations and the race of his ancestors" (Watson, 1924, p. 104).

Little Albert BBC doc  The Brain: A Secret History:
https://www.youtube.com/watch?v=n1hAQphEiMg ,
5.15 – 12.30 min
http://johnlocker.com/science-tech/the-brain-a-secret-history-emotions-23/ ,
6.07
History of Cognitive Psychology (5)

Gestalt Approach

Europe, beginning 20th century

• humans have basic tendencies to actively organize what we see
• the whole is greater than the sum of its parts
• Gestalt Laws (recognition of visual objects)
• problem solving: concept of insight

- Oval plus two lines = face
- Not separate, but unity and organisation.
- It has a Gestalt, an overall quality that transcends individual elements
History of Cognitive Psychology (6)

Frederic Bartlett (UK)
1886 - 1969

- Human memory is an active, constructive process, in which we interpret and transform the information we encounter
- Used more complex and informal materials than e.g. Ebbinghaus
- “Creative reconstruction of the past”

http://www.webofstories.com/play/richard.gregory/38;jsessionid=71DBC480AE40B759E01449AD14D6EDA2
(duration 2.39)
Emergence of Modern Cognitive Psychology (1)

Cognitive Revolution (growing support for cognitive approach)

- disappointment with behaviorist approach (that only concerns observable stimuli, responses, reinforcement)
- linguistics; Noam Chomsky (structure of language too complex to explain in behaviorist terms)
- human memory research: memory models
- children's thought processes: cognitive strategies; Jean Piaget

http://gocognitive.net/interviews/cognitive-revolution ; 5.10 ; Alan Baddeley

By the mid-1970s, the cognitive approach had replaced the behavioral approach as the dominant theory
Emergence of Modern Cognitive Psychology (2)

1960s: new theoretical approach to human memory

The Information-Processing Approach

a) Mental processes are similar to the operations of a computer.

b) Information progresses through the cognitive system in a series of stages, one step at a time.

Example of information processing approach:

Atkinson-Shiffrin model

- Memory involves a sequence of separate steps; in each step, information is transferred from one storage area to another
  - sensory memory
  - short-term memory (working memory)
  - long-term memory

- Popular in emerging field of cognitive psychology
Atkinson and Shiffrin’s Model of Memory

Example:

Lecture (room, students, slides, explanation)

Only some of this enters working memory

Only some of this remains in long-term memory

The Current Status of Cognitive Psychology

- more complex models
- widespread influence on the discipline of psychology
- the importance of mental representations
- applications of the cognitive approach in therapy
- issues of ecological validity
- replication crisis: how trustworthy are the experiments conducted?
Ecological validity

The extent to which the conditions simulated in the laboratory reflect real life conditions.

Experimental laboratory-based research method (tradition in Cognitive Psychology):
• rigorous control for confounding variables
• study of only the phenomenon of interest.

Measures causality by
• manipulation of the independent variables in the experimental setup
• observing the changes that result (measured in the change of the dependent variable)

What is applicability and generalisability with regards to the richness of everyday life?

Human action is situated and highly contingent on contextual factors/variables. To obtain 'valid' results, humans should be studied in the richness of their natural environment.

‘Ecological' research methods also in HCl community, e.g. observing the user or conducting user experiments in the user's natural context (the context of use).

Lab versus natural setting

http://www.nngroup.com/articles/mobile-usability-testing/

http://venturebeat.com/2011/03/15/google-nfc-tests/
Break

The coffee machine is broken!
Basics on emotion

1. Emotion is a reaction to events deemed relevant to the needs, goals, or concerns of an individual; and,
2. emotion encompasses physiological, affective, behavioral, and cognitive components.

Components of emotion:
• Valence (positive, negative, neutral)
• Aboutness, they are about something—“intentional”
• Function, vital for survival
• Response consists of multiple components again
  – Subjective experience (how it feels)
  – Behavioral (outward display of behaviour, face, movements)
  – Physiological aspects (brain, autonomic nervous system – changes in heart rate, breathing, sweating)

https://www.youtube.com/watch?v=slwdzpg4Aqk
Human Emotion 1.3 : What is an emotion?
(Dr. June Gruber, Department of Psychology, Yale University)

http://gruberpeplab.com/teaching/psych131_summer2013/expertseries.php
James, 1884: My thesis on the contrary is that the bodily changes follow directly the perception of the exciting fact, and that our feeling of the same changes as they occur IS the emotion.

We physically react to a stimulus and experience the associated emotion at the same time: we feel emotions and experience physiological reactions such as sweating, trembling and muscle tension simultaneously. Emotions result when the thalamus sends a message to the brain in response to a stimulus, resulting in a physiological reaction.
An individual senses the emotional object/situation through the sense organ; then experiences autonomic arousal. The individual uses the immediate environment to search for emotional cues to label the physiological arousal. This can sometimes cause misinterpretations of emotions based on the body’s physiological state.
Before emotion occurs, people make an automatic, often unconscious, assessment of what is happening and what it may mean for them or those they care about. There is no emotion without cognition.
Common sense
“I tremble because I feel afraid”

James-Lange
“I feel afraid because I tremble”

Cannon-Bard
“The dog makes me tremble and feel afraid”

Schachter
“I label my trembling as fear because I appraise the situation as dangerous”

Stimulus → Conscious feeling

Fear

Autonomic arousal

Conscious feeling

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## Classification systems

<table>
<thead>
<tr>
<th>Theorists (example)</th>
<th>Theory</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic / Discrete</td>
<td>Emotions as discrete categories, biologically fixed, universal to all humans (and many animals).</td>
<td>Basic Emotions: Anger, disgust, fear, happiness, sadness, surprise. Complex Emotions: Arise from combination of basic emotions or are culturally influenced and constructed.</td>
</tr>
<tr>
<td>Dimensional</td>
<td>Emotions are a combination of several psychological dimensions.</td>
<td>Wilhelm Wundt, James Russell, Lisa Feldman Barrett</td>
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</table>
Basic Emotions

Inside Out

https://www.youtube.com/watch?v=8Cn1pYnAZSE (0 - 2min.44)


Matsumoto, Huang, 2011
Dimensional model: arousal/valence

Russell:

• underlying any emotion is core affect, a state with two dimensions: level of arousal, level of pleasure;
• internal or external causes (people have no introspective access to what causes it);
• continuous (2D) assessment of one’s current state;
• free floating or attributed

Circumplex model of emotion, Russell, 1980
Measuring emotions: an example

FIGURE 1
The Self-Assessment Manikin (SAM)

Bradley & Lang 1994
Are emotions innate or learned (1)?

1. Evolutionary theory: all emotions are innate, evolved to address a specific environmental concern; each emotion is associated with a unique set of physiological and cognition-biasing responses;

2. Emotions are learned social constructions (except startle and innate affinity/disgust); emotions are likely to vary considerably across cultures;

3. Basic emotions are innate, shared by all humans (e.g. Ekman); e.g. anger, joy, sadness, fear, disgust. Other emotions are combinations or socially learnt differentiations; small set of innate, basic emotions.

Facial expressions of emotion are hardwired into our genes (Journal of Personality and Social Psychology). The research suggests that facial expressions of emotion are innate rather than a product of cultural learning.

Credit: Bob Willingham

https://www.youtube.com/watch?v=5G6ZR5JgTI&feature=player_detailpage
Are emotions innate or learned (2)?

<table>
<thead>
<tr>
<th>Evolutionary</th>
<th>Social Constructivist (aka “Cultural Relativism”)</th>
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<tbody>
<tr>
<td>Emotions are biologically rooted, part of our evolutionary history.</td>
<td>Emotions constructed by cultural values, institutions, and language.</td>
</tr>
<tr>
<td>Emotions serve specific functions.</td>
<td>Biology (brain, physiology) play little to no role in emotions.</td>
</tr>
<tr>
<td>Emotions are universal across cultures.</td>
<td>Emotions are open systems, can be constructed in many different ways.</td>
</tr>
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</table>

https://www.youtube.com/watch?v=6xEr_nJHc2s
Yale Courses: Human Emotion 5.1: Culture and Emotion
How does culture shape emotions (1) ?

1. Culture suggests what are appropriate elicitors (i.e. antecedent conditions) for an emotion.
   – Example: relationships (families, children) elicit happiness in the USA; achievement, accomplishment in Israel;

2. Culture shapes appraisals of emotions (cognitive theory); individualistic values versus collective, group values.

3. Culture shapes emotional display rules (how emotions are expressed, and when and where it is appropriate)
Emotion display rules
How does culture shape emotions (2)?

- Culture gives shape to the value we place on experiencing emotions.
- Culture influences which emotions are emphasized and talked about.
- Culture shapes our language for emotion (E.g. Schadenfreude/leedvermaak).

![Affect Valuation and Culture](image)
Neither nature nor nurture

Emotions are multifaceted and have multiple causes; these overlap and intersect to make up an emotion.
Literature for week 2

• Matlin, Chapter 1, pp.2-13 (for the exam);
  – read the rest of the chapter for understanding of cognitive neuroscience techniques; and how the book is to be used effectively.
• Matlin Chapter 2, pp.34-54 (for the exam);
  – read 55-65 for general knowledge of face and speech perception.
• Matlin Chapter 3, pp. 70-90 (for the exam)
• Gruber, What is an Emotion?
  https://www.youtube.com/watch?v=slwdzpg4Aqk (for the exam)
  – Extra: Watch June Gruber, Culture and Emotion,