The Dörner Model of Emotion

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Emotion modeling approaches

- engineering vs. science
- descriptive vs. explanatory

- different goals:
  - high-level behavior
  - individual behavior
  - communication:
    - display
    - recognition
  - role within cognition
Emotion

- Having an emotion is different from behaving as if having an emotion
- What is it like to have an emotion?
- Can emotion only be simulated, or can an artificial system be in an emotional state?
  → is having an emotion a way or an aspect of information processing?

State models, appraisal theories

- Orthony, Clore, Collins
- Scherer (SECs)
Parameter space models

Emotions emerge over basal parameters:

- Wundt (1910)
  - Pleasure/Displeasure
  - Arousal/Calm
  - Tension/Relaxation
- Osgood (1957)
  - Evaluation (Valence)
  - Arousal
  - Potency
- Traxel and Heyde (1961)
  - Submission/Dominance
  - Valence
- Plutchik, Izard, Johnson-Laird, James:
  - different basic emotions
  - intensity
Example: Plutchik

Psi theory

- Dietrich Dörner
  *Universität Bamberg*

**Psi Theory of Human Action Control:**
- Emotion, Motivation
- Cognition
- Representation
- Semantics through interaction
Psi theory

- cognitive architecture with a difference:
  - emotion
  - motivational system
  - learning “from scratch”
  - all symbols within architecture refer to an interaction context
  - flexible representational structures to capture behavior, impose object structures upon the world, conceptualize own interaction upon world
→ allows thinking about cognition in terms of a constructionist stance

What the Psi theory has to say about emotion

- Emotion is seen as a configuration of a cognitive system
- Modulators of cognition:
  - arousal, selection threshold, securing threshold, resolution level
  - estimate of competence and certainty
  - pleasure/distress signals
- action dispositions
- Emotion itself is emergent property of modulation
**Psi model**

- Emotion as modulation of cognition

**Dörner model of emotion**

- Covered aspects
  - affects (valenced reactions)
  - moods (effect on cognitive processing)
  - emotional dispositions (effect on action selection)
  - emotional expression

- Ignored aspects
  - emotion recognition
  - emotion classification
Emotional configuration in Dörner model

Affects (specific reaction to events)
- negative or positive valence of different drive-related events:
  - pain/relief
  - hunger/satisfaction
  - affiliation/social frustration
  - certainty/re-orientation
  - ...

Appetence and aversion

![Diagram showing the emotional configuration and appetence/aversion system]
Emotional configuration in Dörner model

- Moods:
  - affect (valenced reaction to recent event)
  - general competence
  - general certainty -> securing rate
  - arousal
  - selection threshold
  - resolution level

Purpose of emotional modulation

- Control width, depth and bias of operations on mental representations of the agent → modify perception, memory, planning and action selection
- Reduce complexity of cognitive processes
Effect of Competence and Certainty on modulation

Emotional disposition towards something
- Appetence + Aversion
- Competence
- Certainty
- Connected to representations by learning
Emotional expression
More information

www.cognitive-agents.org