FROM A COGNITIVE POINT OF VIEW 1

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Digital Humanities

WHAT IS COGNITION?

- Information prosessing -> intelligent behavior
- Intelligent behavior:
  - •Flexible, adaptive and purposeful action
  - •In complex, partially predictable environment

(a) (b)

Focus on action control, not in mind-as-a-mirror-of-the-world

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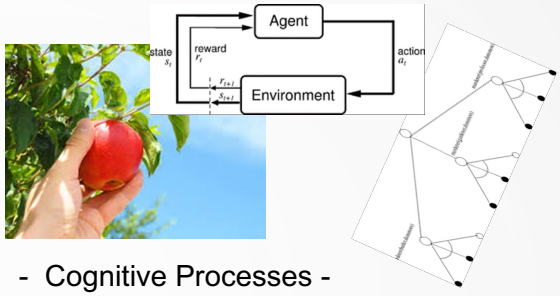
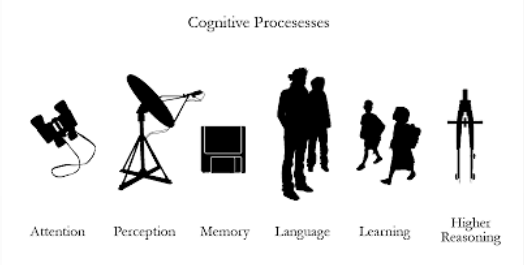
COGNITION

A cognitive agent: What should one do next in a changing environment?

- Focus: Cognitive control of action/interaction **in** an environment
- Framing: how the interaction impacts on cognitive processes/information processing tasks
- What information processing tasks?
- **Which processes/mechanisms**?
- By which principles? Why?



- Cognitive Processes -



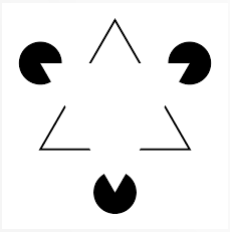
BASIC PRINCIPLES: 1. SEEK FOR OPTIMAL STRATEGIE(S)

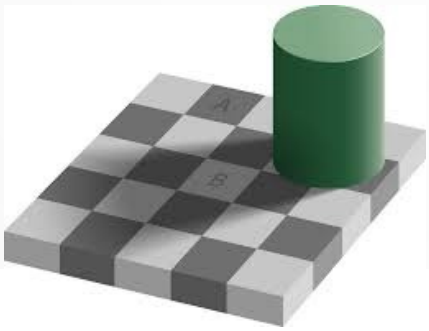
- Cognitive systems: the optimally efficient result with minimal costs
  - *Goal: optimal result ("effect") with minimal costs ("efforts")*
  - *Goal: good decision, succesful action, novel ideas…*
  - *Efforts: energy costs, memory load,…*
- **BUT,** biological brains computationally limited:
- can process only a small subset of information available
  - *Pressure to reduce the amount of information*
  - *Evolutionary hard wiring*
  - *Learning, culture, social interaction*
- "Starting point for cognition friendly design"

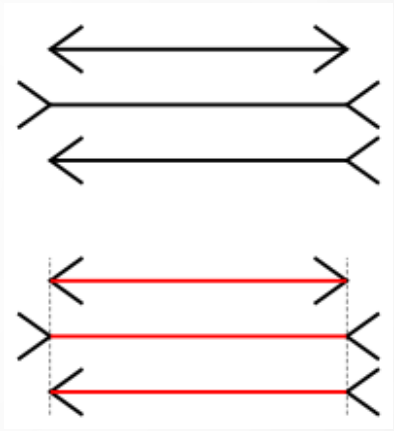
BIOLOGICAL BRAINS ARE COMPUTATIONALLY LIMITED:

Perception: We don´t perceive world as it is

Both bottom up (sensory input) and top down (higher level control) guidance of perceptual processes







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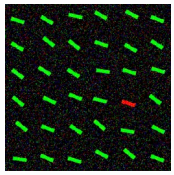
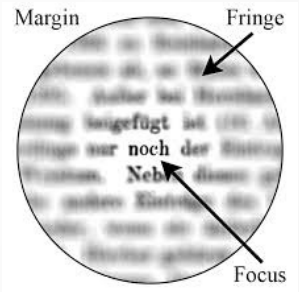
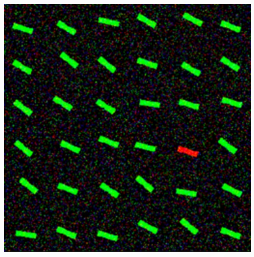
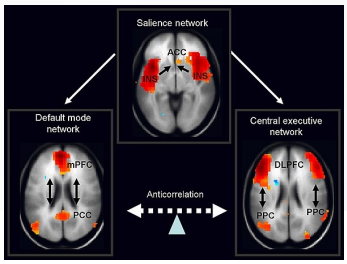




SELECTIVE ATTENTION: MECHANISMS - EXAMPLE: SALIENCE (PERCEPTION)

- Early visual processing
- A property of stimuli; how an item is different?
  - •Vision: color, brightness, shape…
- pop up- effect
- Directs attention





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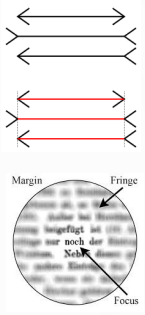

TAKE A LOOK AT THE PICTURE

WHAT WAS IN THE PICTURE? - MAKE A LIST

TAKE A LOOK AT THE PICTURE

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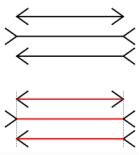
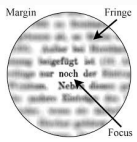
The capacity of working memory (+/- 4 items)

The structure of long term memory (schemes, narratives, etc)





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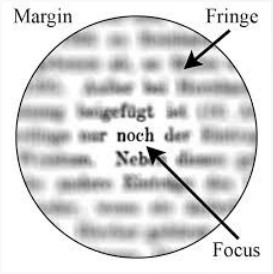

- The world is too complicated for us…

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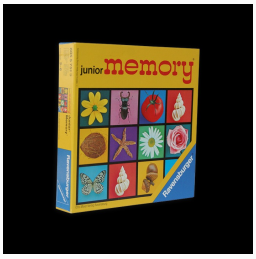

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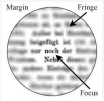


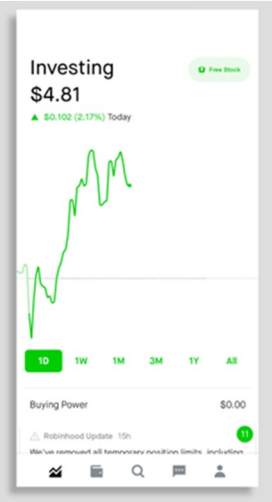
- The world is too complicated for us…
- **4. Reasoning, decion making, problem solving:**
  - require a lot of processing
  - **To reduce the amount of cognitive "load" we rely on heuristics, familiar narratives, cultural codes etc…**
  - **Support for memory**
- 5. Communication;
  - language + other publicly shareable symbol systems tools for (i) transmitting information ("communication") and (ii) extending our cognitive capacities
  - Abstract concepts, conceptual systems… narratives, familiar frames, external tools (visualizations, books, displays…)

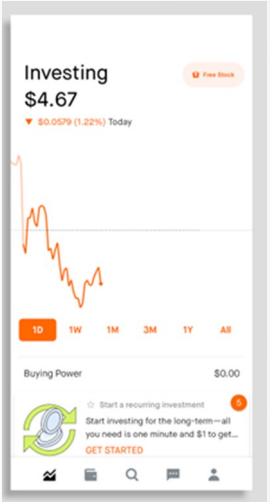
- For example; which one is true?

1. Isawablackcatthismorning
2. I saw a grey cat this morning

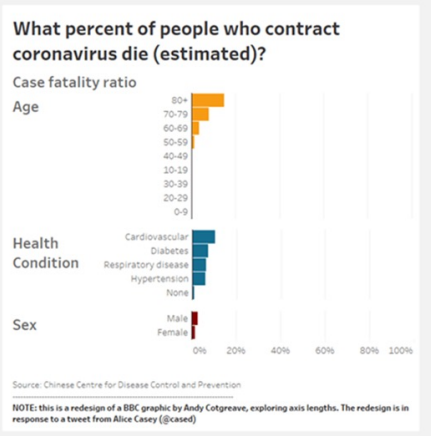
A GROUP WORK: - VISUALIZATIONS

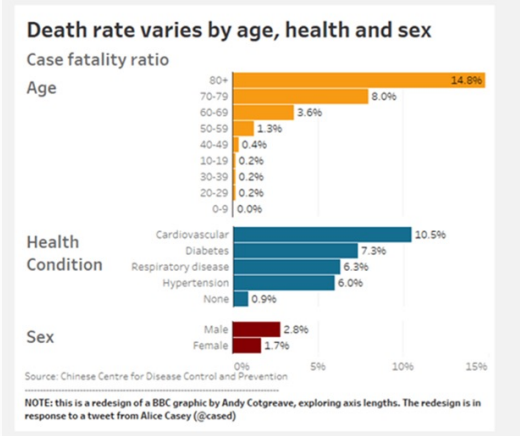
- Select a visualization, for example a graphic display for investing
- How does this visualization utilise knowledge on human cognitive systems?
- Perception, attention (salience)
- Memory (decreasing memory load)
- Problem solving, decision making
  - Narratives, codes, symbols,…?





SOMETIMES THEY GO WRONG…





A GROUP WORK: TASK

Prepare a presentation, where you describe

- The selected visualization
- Analysis of it from a cognitive point of view
- Comments:
- Accessibility issues: is the content available to all, or some limitations?
- possible underlying ”messages”?
- lessons to be learned?

SOME INFORMATION ON COGSCI COURSES

- Courses.helsinki.fi:
- Search by a code **LDA-C for the course list**
- Information about the courses, places, times…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