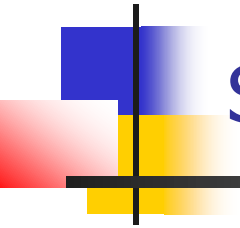

Spatial Knowledge and Visual Memory (Part2)


MARIO KART
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Spatial Knowledge

- **Models of recognition**
  - Exemplar variations
    - Most attitudes, objects, stimuli consist of many possible examples
    - We compare new stimuli with what is already established in memory (“category judgments”)

Spatial Knowledge

- Models of recognition

  - Template matching

  - Incoming sensory information compared directly to copies (templates) in LTM

(a) Template for “A”

A B C

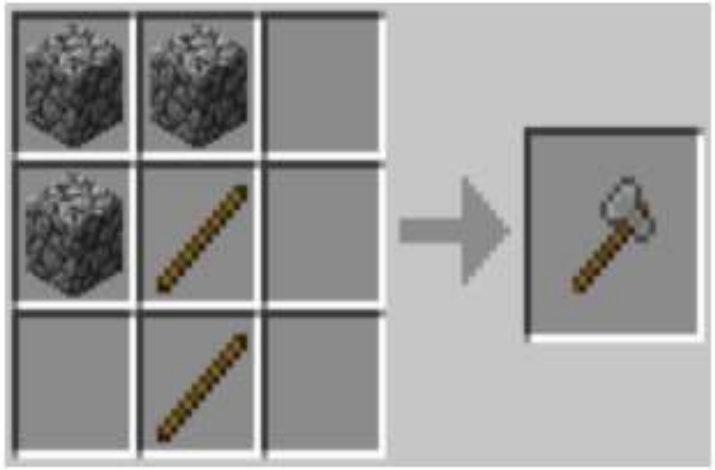
Letters to recognize

Overlap of template and typed letters

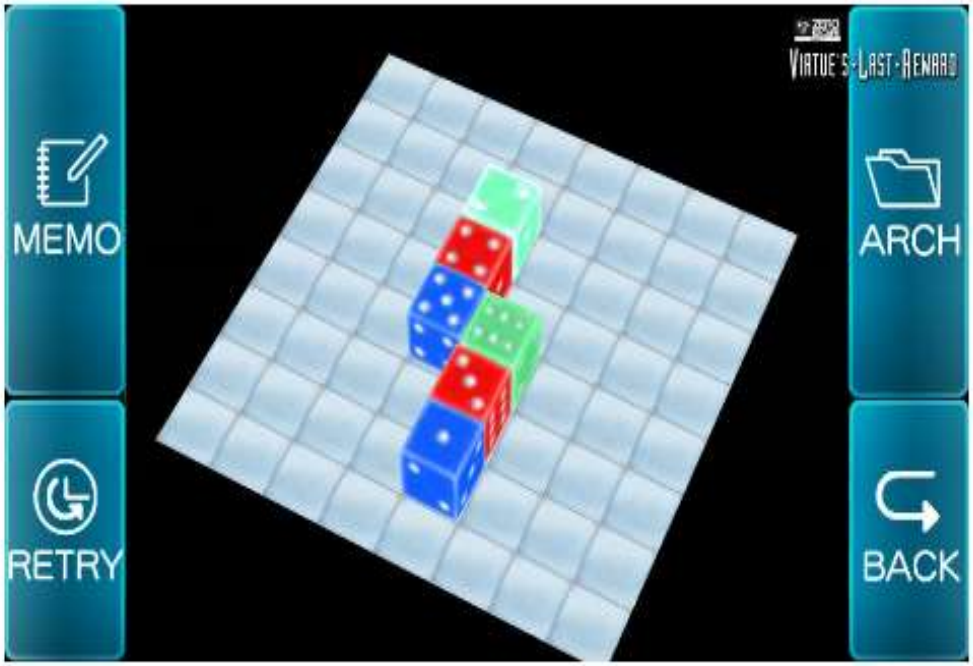
(b) Overlap of template for “A” and written letter “A”s

Skyrim

Fallout 3

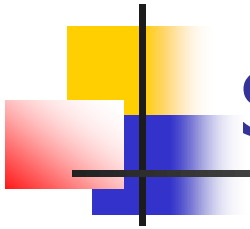


Minecraft



Virtue's Last Reward

Professor Layton



Spatial Knowledge

- Models of recognition

  - Feature matching

  - Extract important or discriminating features and match to established known features

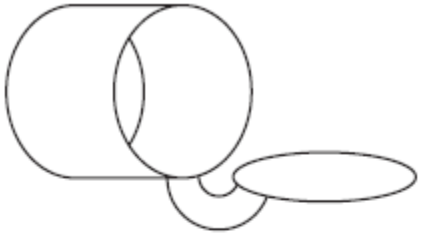
Final Fantasy XII

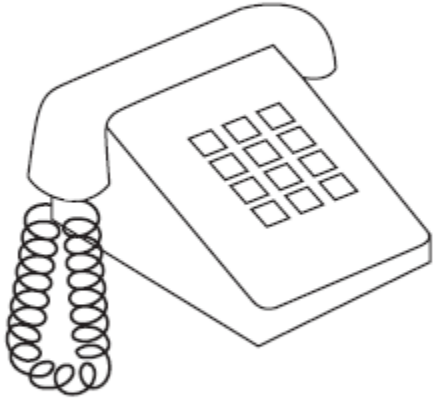
Riven

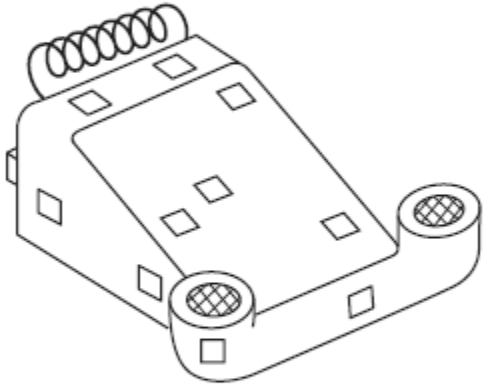

Limbo

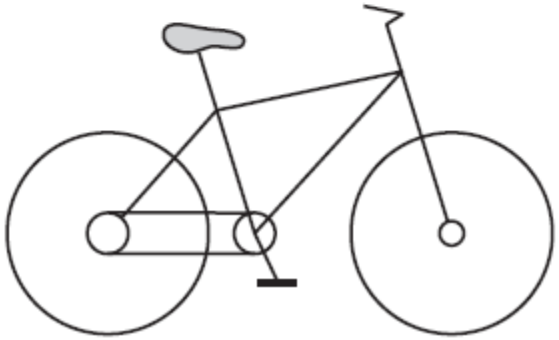
Spatial Knowledge

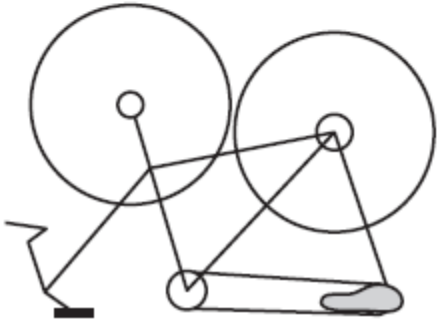
- Models of recognition
  - **Recognition-by-components**
    - Finding the basic “building blocks” of stimuli



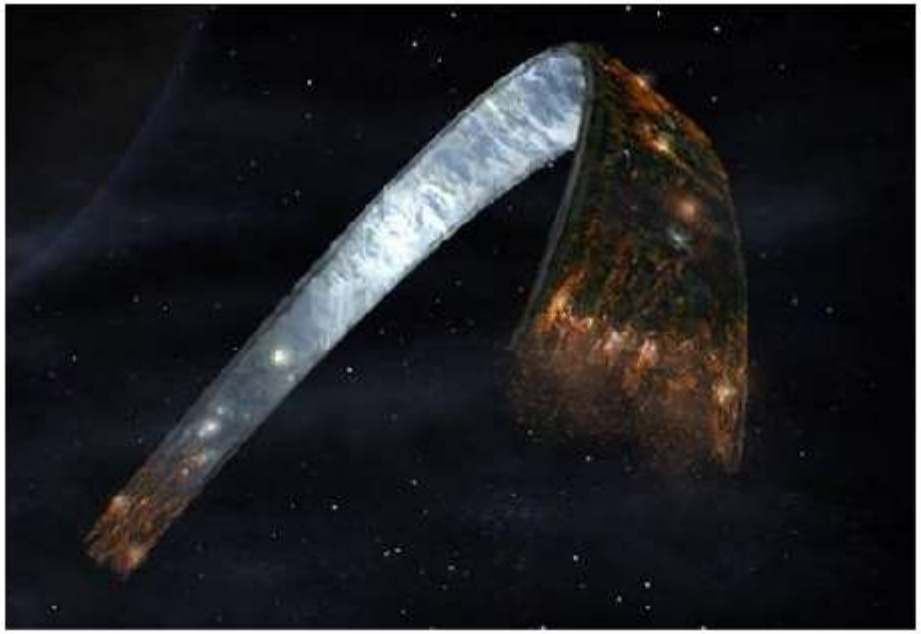




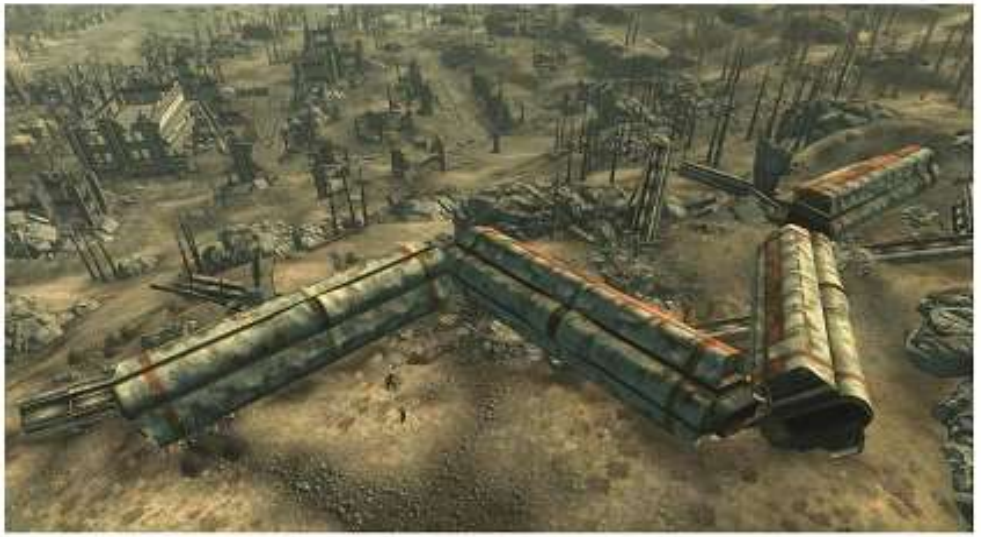




The Last of Us



Halo



Fallout 3

Spatial Knowledge

- Models of recognition

  - Configural models

  - Analysis based on deviations from the prototype
  - How we recognize different individual examples of a category (e.g., faces)

Assassin's Creed

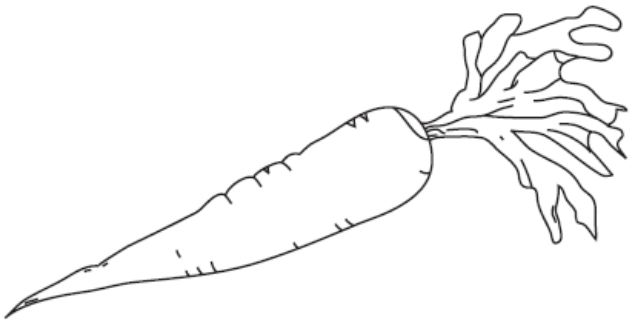
Elite: Dangerous

Face perception adaptation

First, notice that the face in the middle looks normal. The face on the far left has features too close together and the face on the far right has features too far apart. Note that the distance between features of the face, such as the space between the eyes, has a strong impact on our perception of the face. Now, stare at the face on the far left for 60 seconds. Then switch your gaze back to the middle picture. If you have adapted for long enough, the face in the middle will now look distorted in that it will appear as if the features are too far apart.

Visual Memory

- When the brain cannot recognize
  - **Agnosia ("without knowledge")**
    - Results from damage to the brain, not sensory organs
    - No sensory deficits, yet mental recognition fails (e.g., *visual agnosia*)



(a)

(b)

Visual Memory

- When the brain cannot recognize
  - **Prosopagnosia**
    - Inability to recognize different faces
    - Can differentiate faces from other objects (e.g., a pumpkin)

Visual Memory

- When the brain cannot recognize
  - **Achromatopsia ("cortical color blindness")**
    - All color vision lost, along with memory of color
    - Loss not due to damage in eyes or optic nerve
    - World represented in mostly gray shades

Visual Memory

- When the brain cannot recognize
  - **- Synesthesia**
    - Stimulation of one sensory/neurological pathway consistently and automatically stimulates other processing pathways

Visual Memory

- When the brain cannot recognize
  - **- Synesthesia (con't)**
    - *Chromesthsia*: sounds perceived as color
    - *Mirror-touch*: observed touch is experienced
    - *Lexical-gustatory*: taste experienced when hearing certain words or phrases

Visual Memory

- When the brain cannot recognize
  - **- Akinetopsia (“motion blindness”)**
    - Movement perceived as collection of still images
    - Difficulty evaluating when moving targets (like cars) will pass, or stop
    - Difficult to determine when to stop motion (e.g., walking, pouring water into a glass)

Visual Memory

- When the brain cannot recognize
  - **Apraxia**
    - Deficits in ability to plan motor actions
    - Can explain how to perform behaviors ("brushing teeth") but not able to picture it ("pretend you are now brushing your teeth")

Visual Memory

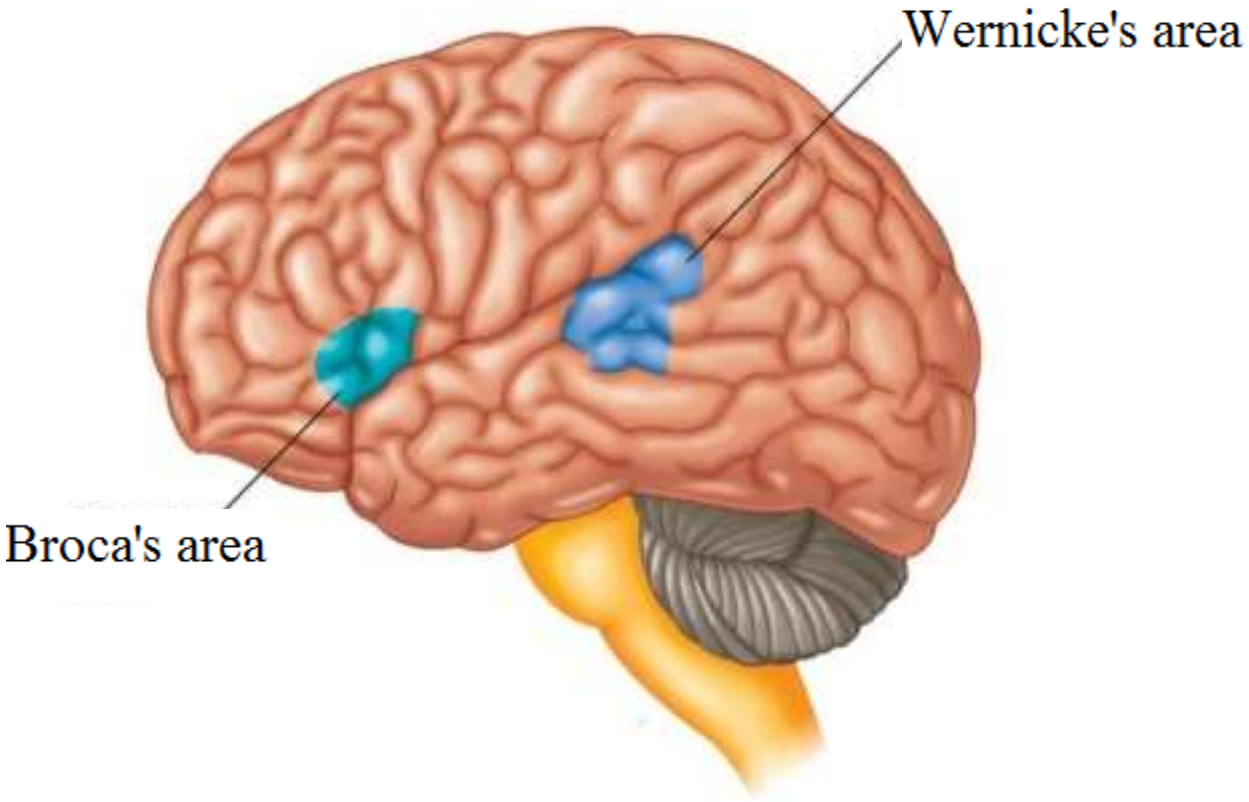
- When the brain cannot recognize
  - **- Ageusia (“taste blindness”)**
    - Can result from sensory damage or from neurological disorders
    - Common symptom is a constant metallic taste

Visual Memory

- When the brain cannot recognize
  - **Anosmia ("smell blindness")**
    - Inability to detect odor
    - Can be temporary (due to inflammation) or permanent

Visual Memory

- When the brain cannot recognize
  - **Broca's aphasia**
    - Difficulty physically producing language sounds (motor speech)
  - **Wernicke's aphasia**
    - Difficulty understanding language


Wernicke's area
Broca's area

Visual Memory

- When the brain cannot recognize
  - **- Sensory Modulation Disorder**
    - Extreme over (or under) response to everyday sensory stimuli
    - Strong correlation with other sensory-related pathology (e.g., autism, schizophrenia, dissociative disorders)