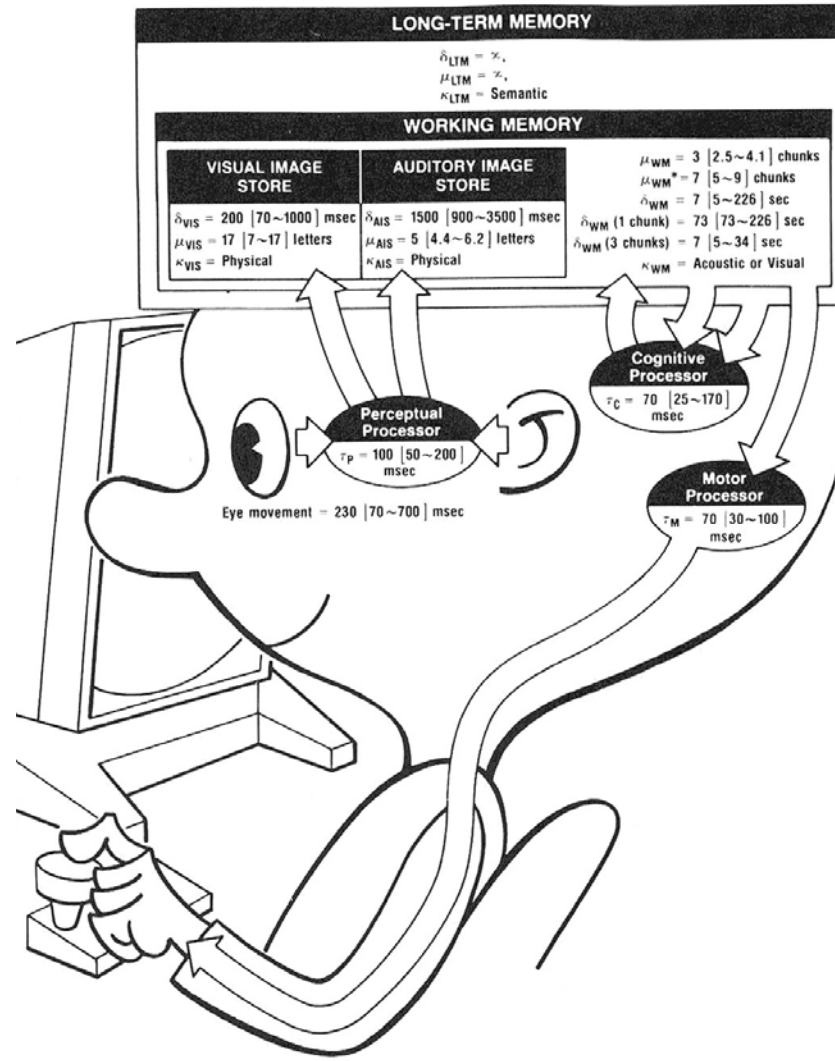


# Questions?

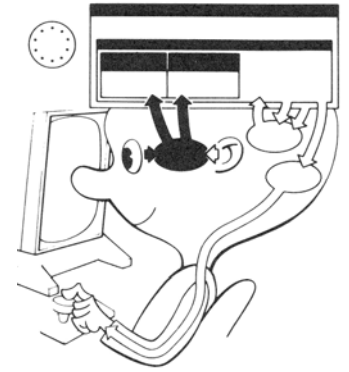
- Project #1

# Human Information Processor (Card, Moran, Newell)



# Perceptual Processor

- Physical store from our senses: here sight
- Decoded for transfer to working memory
  - Progressive
    - *Example: 10ms/letter*
  - Selective
    - *Spatial*
    - *Pre-attentive: color, direction...*
- Capacity
  - Example: 17 letters



# Pre-attentive perception: How many 3s?

85689726984689762689764358922659865986554897689269898  
02462996874026557627986789045679232769285460986772098  
90834579802790759047098279085790847729087590827908754  
98709856749068975786259845690243790472190790709811450  
85689726984689762689764458922659865986554897689269898

# Pre-attentive perception: How many 3s?

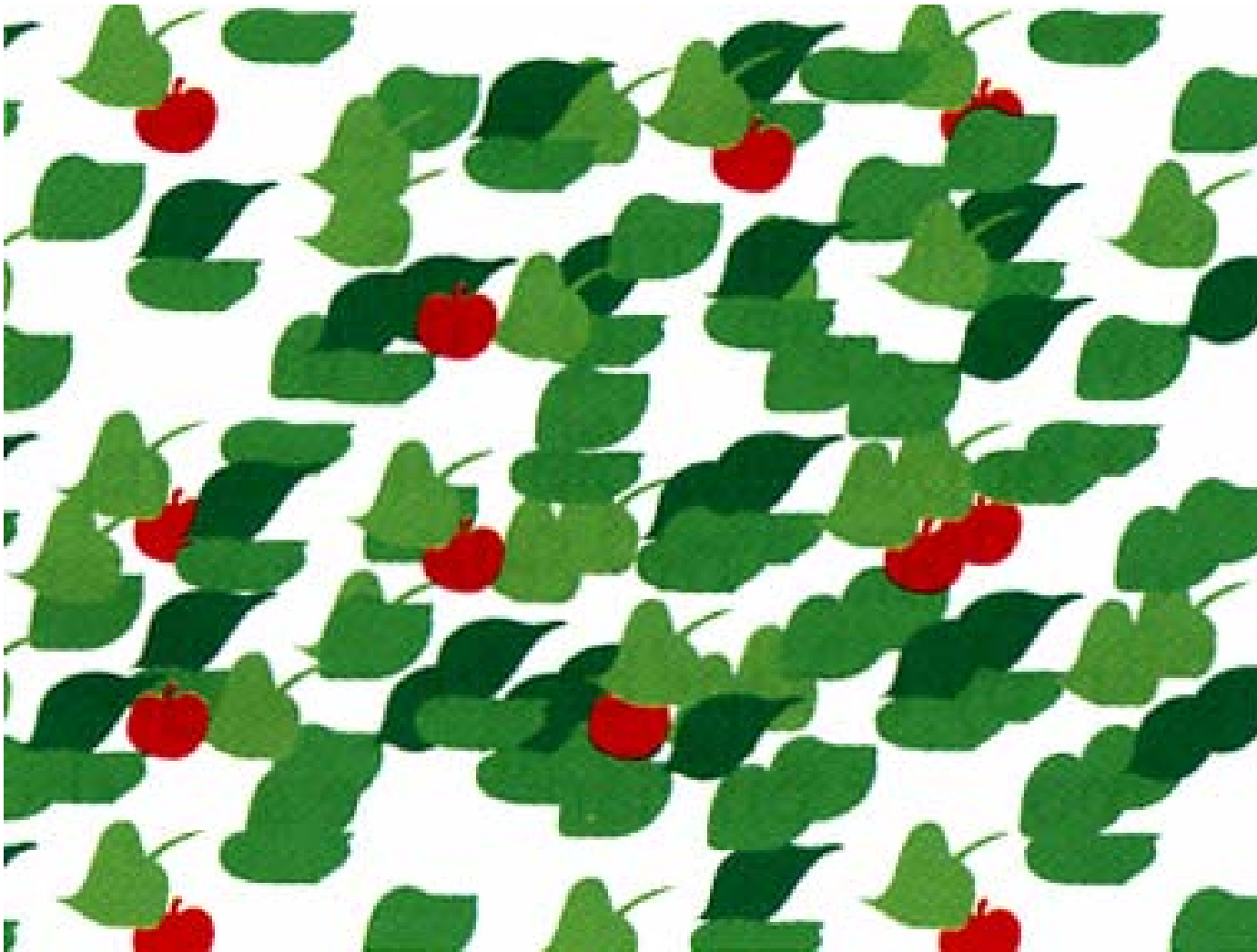
85689726984689762689764**3**58922659865986554897689269898  
024629968740265576279867890456792**3**2769285460986772098  
908**3**4579802790759047098279085790847729087590827908754  
9870985674906897578625984569024**3**790472190790709811450  
85689726984689762689764458922659865986554897689269898

# Where are the cherries?



From Information Visualization, C. Ware

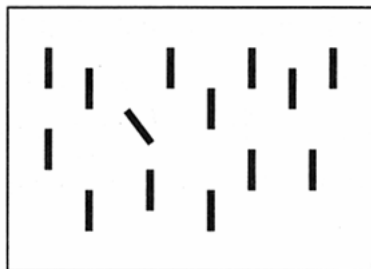
# Where are the cherries?



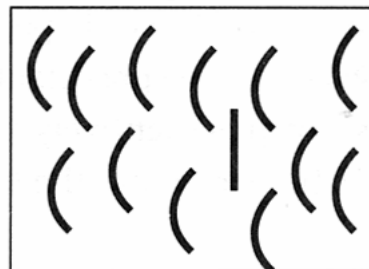
From Information Visualization, C. Ware

# Other examples of pre-attentive variables

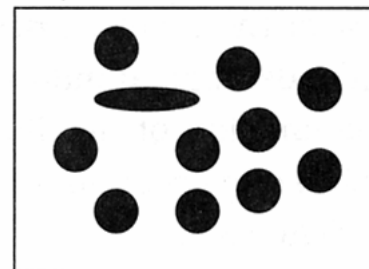
Orientation



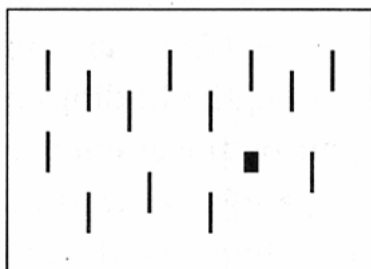
Curved/straight



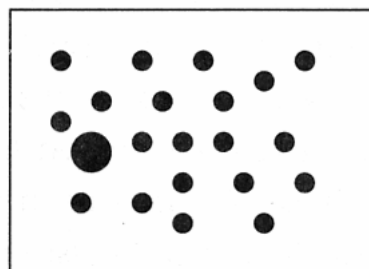
Shape



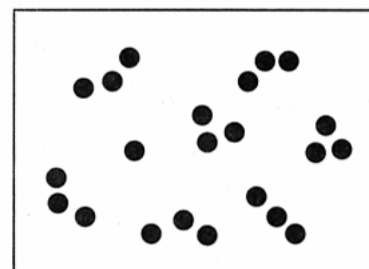
Shape



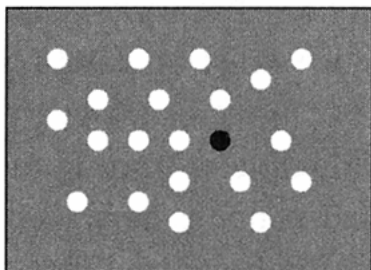
Size



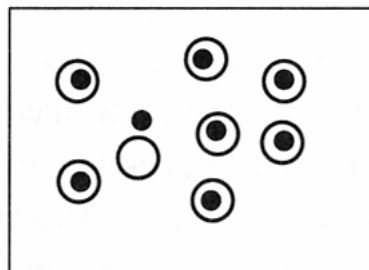
Number



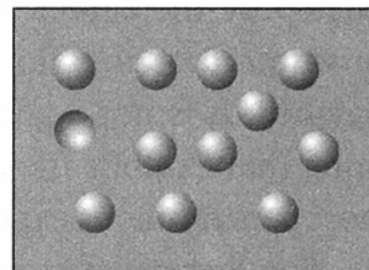
Gray/value



Enclosure



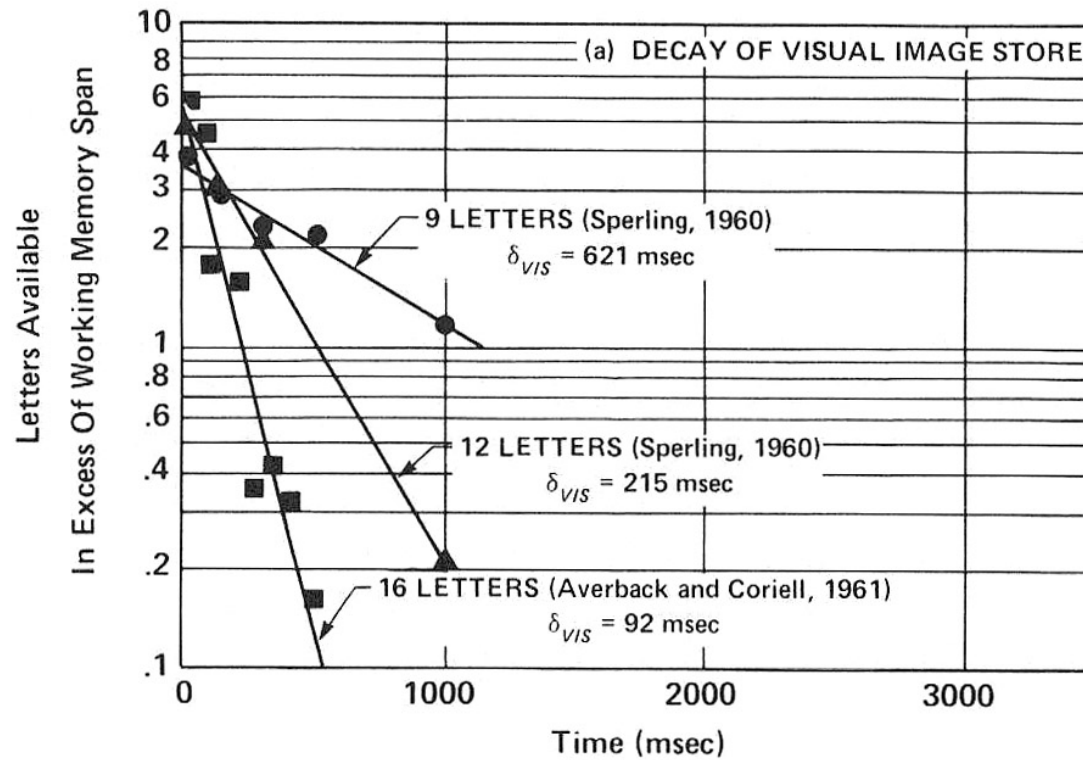
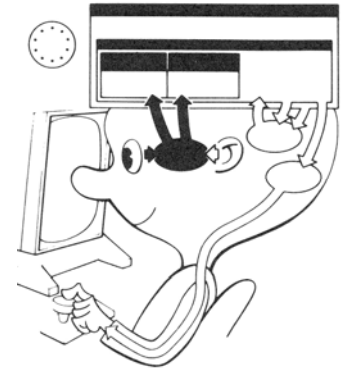
Convexity/concavity



From Information Visualization, C. Ware

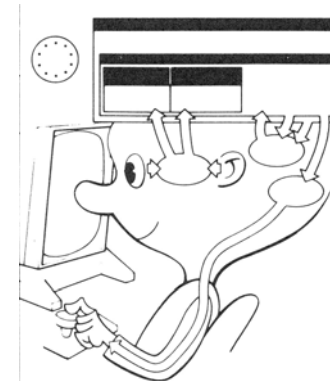
# Perceptual Processor

- Decay: 200ms

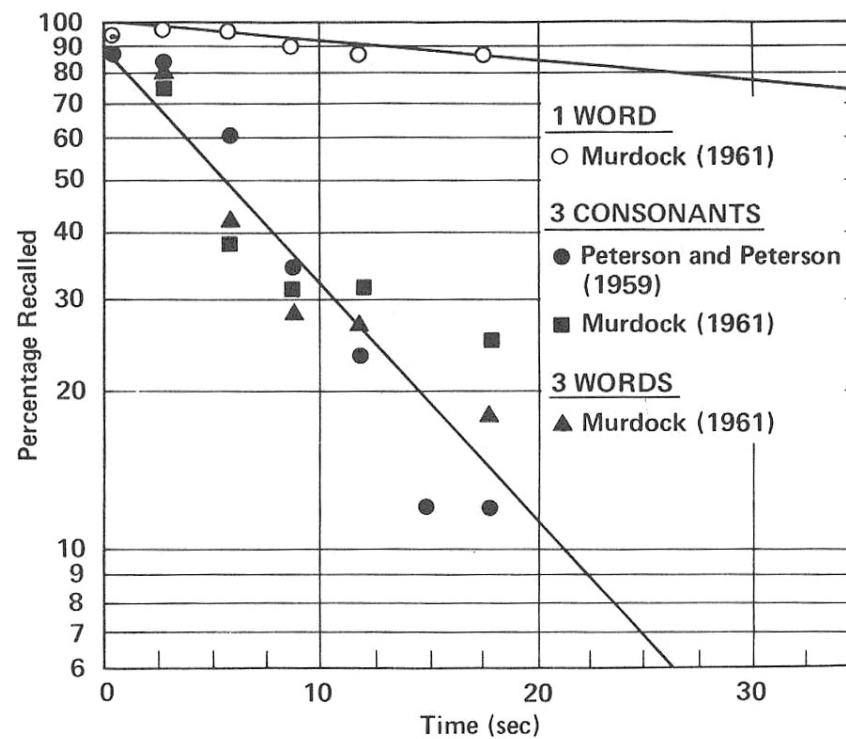




# Working Memory

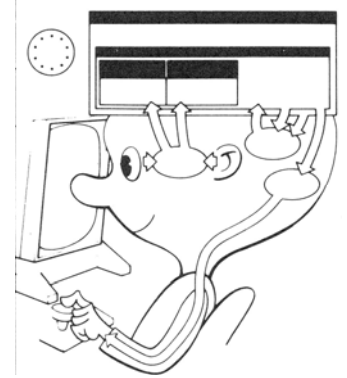


- Access in chunks
  - Task dependent construct
  - $7 \pm 2$  (Miller)
- Decay
  - Content dependant
  - Limit attention span



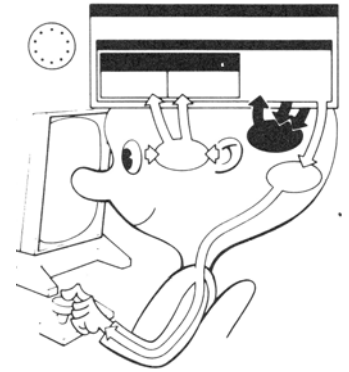
# Long term memory

- Very large capacity
  - Semantic encoding
- Associative access
  - Fast read: 70ms
  - Expensive write: 10s
    - *Several Rehearsal and/or recall,*
- Context at the time of acquisition key for retrieval
- Noisy



# Cognitive Processor

- Cycle time: 70ms
  - Can be modulated
- Typical matching time
  - Digits: 33ms
  - Colors: 38ms
  - Geometry: 50ms...
- Fundamentally serial
  - One locus of attention at a time
    - *Eastern 401, December 1972*
      - Crew focused on checking the landing gear indicator bulb,
      - Meanwhile the aircraft is losing altitude (horn, warning indicator...),
      - Aircraft crashed in the Everglades
      - see “The Human Interface” by Raskin, p25
    - *But what about driving and talking?*



# Motor Processor

- Receive input from the cognitive processor
- Execute motor programs
  - Pianist: up to 16 finger movements per second
  - Point of no-return for muscle action

