Visual Attention

Spotlight Model (Posner)

- Focus visual attention to an area by using a cue
  - “Spotlight” or “zoom lens”
- measure time to identify target item when:
  - observer does not know where item will appear
  - observer does know where item will appear
- cue is a briefly presented dot at the location of target

• no cuing: what letter appears?

• with cuing: what letter appears?

• no cuing: what letter appears?

• with cuing: what letter appears?
• with cuing: what letter appears?

Results: Cue versus No Cue

Time

No Cue  Cue

Advance knowledge of location improves performance

Results: Relative position of Cue

Greatest reduction at location of cue

Amount of reduction depends on distance from cue
- attention is like a spotlight or a zoom lens

Cue triggers “formation of a spotlight”
- whatever is in spotlight is attended
- more it is attended, the better it is processed
- size, shape of spotlight can be controlled

Different types of cues

a) exogenous (outside generating)
   • low-level “reflexes”
   • sudden changes (e.g., flash or movement)
   • draws attention automatically

b) endogenous (inside generating)
   • high-level control
   • instruction (via some kind of visual sign or pattern)
   • sends attention to requested location

Exogenous Cuing
Exogenous Cuing

No interpretation needed - cue is at target location

Endogenous Cuing

Observer need to interpret the cue

Endogenous Cuing

Observer need to interpret the cue

Effect of Cues

- Both types of cues control the same attentional mechanism (spotlight) but reflect different strategies
  a) exogenous *(low-level control)*
    - bottom-up control of attention
    - based on what’s actually happening in environment
  b) endogenous *(high-level control)*
    - top-down control of attention
    - based on what observer believes
Cuing Task (Posner Task)

X ← Valid
← X Invalid

An Adjustable Width Spotlight? (zoom lens)

• Condition 1
  – Categorize the central letter of a five letter word
  – Respond to probe as quickly as possible
  • HOUSE
  • _ _ _ 7_

• Condition 2
  – Categorize a five letter word
  – Respond to probe as quickly as possible
  • HOUSE
  • _ _ 7_

Visual Attention

• Can be directed at particular regions of space
  – Exogenous Cues
  – Endogenous Cues

• Facilitates/Inhibits target detection
  – Attended/Unattended

• Adjustable Width