

Visual Attention

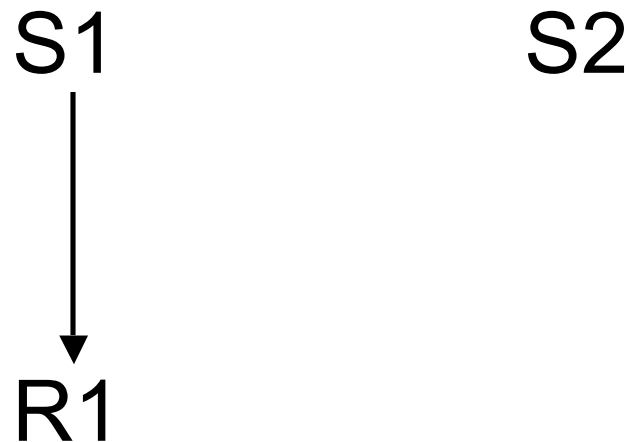
Gordon D. Logan

Varieties of Visual Attention

- Terminology
- A brief history
- Visual search
- Cuing
- Rapid serial visual presentation

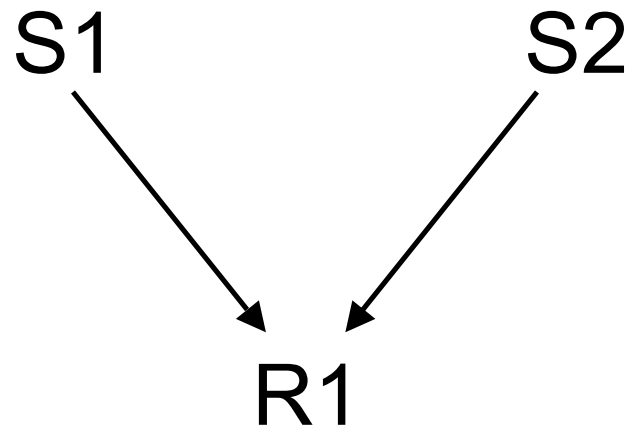
Varieties of Visual Attention

- Focused attention (cuing tasks):



Varieties of Visual Attention

- Divided attention (visual search):



Varieties of Visual Attention

- Dual task (attentional blink):

S1
↓
R1

S2
↓
R2

A brief history

- Prehistory to 1950
 - Wundt
- 1950 to 1960
 - Modern era of attention research begins
 - Welford, 1952; Broadbent, 1958; Sperling, 1960
- 1970 to present
 - Cuing tasks, search tasks, RSVP
 - Eriksen, Treisman, Sperling

Visual search

- From Neisser (1963) to Shiffrin & Schneider (1977)

Visual search

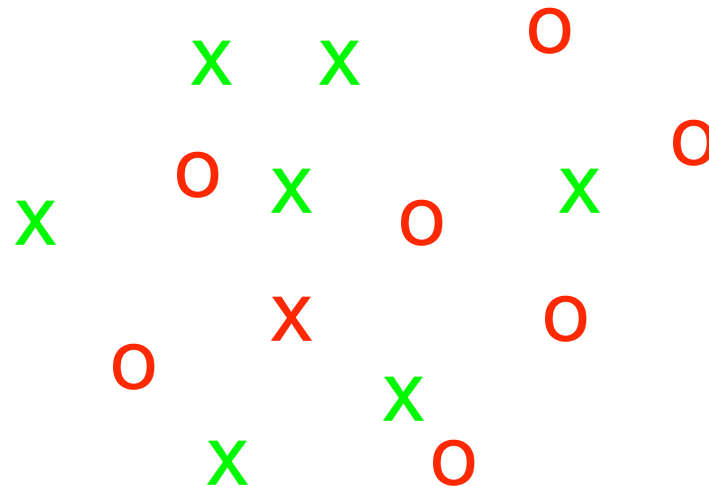
- From Neisser (1963) to Shiffrin & Schneider (1977)
 - Parallel vs. serial processing
 - Exhaustive vs. self-terminating search
 - Consistent vs. varied mapping

Visual search

- Feature integration theory
 - Treisman & Gelade (1980)
 - Treisman & Schmidt (1982)

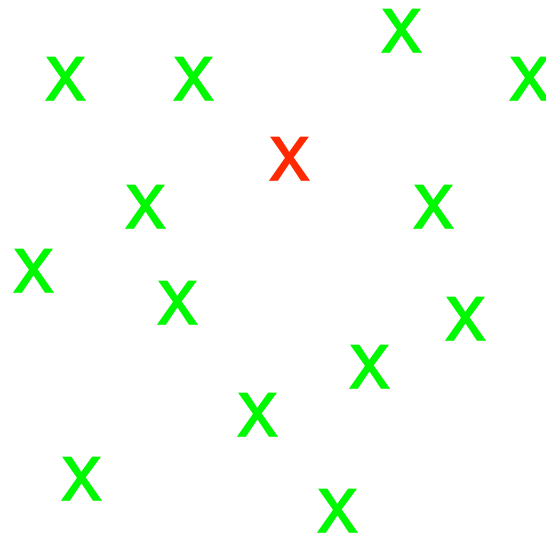
Visual search

- Feature integration theory
 - Conjunction search is hard
 - Find the red X



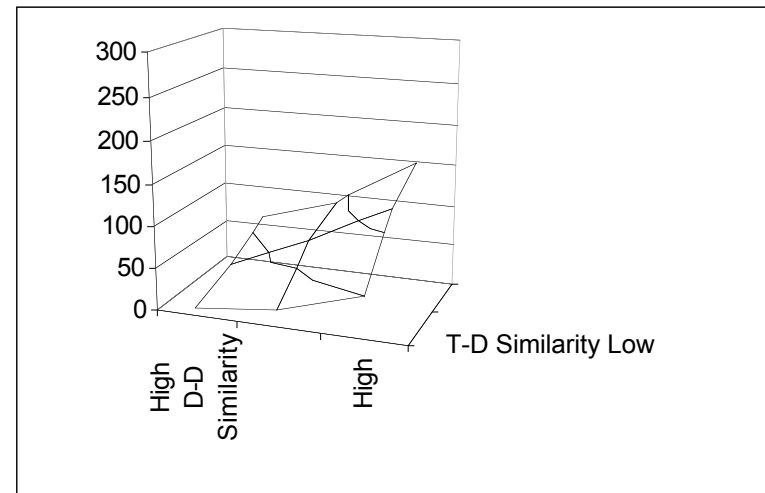
Visual search

- Feature integration theory
 - Feature search is easy
 - Find the red X



Visual search

- Similarity
 - Duncan & Humphreys (1989)
 - Target-Distractor similarity makes search hard
 - Distractor-Distractor similarity makes search easy



Visual search

- Guided search
 - Wolfe (1994)
 - Bottom-up processes compute salience
 - Top-down processes compute salience
 - Search in decreasing order of salience

Visual search

- Capturing attention
 - Yantis & Jonides (1988)
 - Theeuwes (1994)
 - Folk, Remington & Johnston (1994)

Cuing

- Sperling (1960)
 - Whole report
 - Partial report

Cuing

- Sperling (1960)
 - Whole report
 - Partial report

X	T	M	V
D	L	Q	S
B	W	C	P

Cuing

- Sperling (1960)
 - Whole report
 - Partial report

Cuing

- Sperling (1960)
 - Whole report: Limit of 4-5
 - Partial report: Almost unlimited

Cuing

- Averbach & Coriel (1961)
 - Replicate with visual cues

Cuing

- Averbach & Coriel (1961)
 - Replicate with visual cues

M V D S R J P N C Z L H T W
I

Cuing

- Averbach & Coriel (1961)
 - Replicate with visual cues
 - Same results
 - Lots available immediately
 - Fast decay

Cuing

- Eriksen: Cues direct attention
 - Present cues before display
 - Measure time-course of switching attention
 - Interference from adjacent distractors

Cuing

- Flanker task
 - B. A. Eriksen & Eriksen (1974)

HHHKHHH

SSSKSSS

Cuing

- Partially valid cues
 - Posner, Snyder & Davidson (1980)
 - RT faster if cues valid than if cues invalid
 - Inhibition of return
 - RT is slower to a validly cued position if cue-target interval is > 500 ms

Cuing

- Central vs. peripheral cues
 - Jonides (1981); Posner & Cohen (1984)
 - Endogenous vs. exogenous cues
 - Peripheral vs. central cues
 - “Controlled” vs. automatic response to cues

Rapid Serial Visual Presentation

- Visual search in RSVP displays
 - Sperling, Budiansky, Spivak & Johnson (1971)
 - Many characters in each frame
 - Many frames per second

Rapid Serial Visual Presentation

- Attentional blink in RSVP displays
 - Raymond, Shapiro & Arnell (1992)

