

Attention and Performance

Historical notes:

A major focus of early research, motivated by WWII,
that lead to cognitive approach

Yerkes-Dodson Law 1908
(practical implications)

Meanings of attention:
alertness
selection
interpretation

issues: parallel vs. serial processing
serial bottleneck
early vs. late selection

Selective Attention

Auditory Attention

dichotic listening task

Cherry 1953, Moray 1959
little is reportable from unattended ear

Filter Theory

Broadbent 1958

Split Span

2 series of numbers, 3 digits per ear

*recall ~4

*recall by ear

models:

1. as if nature:

metaphor, analogy, imagery

2. purposes:

organize thinking

suggest research questions, via predictions

Problems for Early Selection:

Grey and Wedderburn 1960, Treisman 1960

people will respond to unshadowed information

graded differences in simultaneous messages

tell apart using: direction, pitch, speed, gender, accent

shadowing

what can you tell about rejected message?

whether its speech, sex of speaker, tone

sort of: whether backwards

can't tell: words, what language

Treisman Attenuation Model

hierarchical series of processors

flexible, attenuation

problem?

Late Selection Deutsch & Deutsch 1963

Treisman & Geffen 1967

(attenuation vs. late selection)

filter on message attended to vs. after analysis

shadowing task: respond to target word with a tap

predictions:

late: detect either equally

early/attenuation: nonshadowed worse

results:

shadowed	87%	detected
----------	-----	----------

nonshadowed	8%	detected
-------------	----	----------

Visual Attention

Visual Selective Attention

Neisser & Becklen 1975

*developed out of audio tradition

*lead to rethinking- why?

focus of attention vs. direction of fovea

Posner et al., 1978

fixate point

identify stimulus 7o left or right

expected, no expectancy, unexpected

~235

~265

~305

Posner et al., 1980 can attend 24o from fovea

Pattern Recognition and Attention

Treisman & Gelade 1980

feature integration theory

detecting a T among I and Y
 among I and Z

detecting a conjunction of features requires knowing
position - can't be done in parallel

The binding problem

Treisman & Schmidt 1982

primary task: identify black digits in one place

secondary: identify colored letters in another

-> illusionary combinations

Friedman-Hill, Robertson & Treisman (1995)

parietal cortex damage ->

confusion in above with up to 10 second
presentations

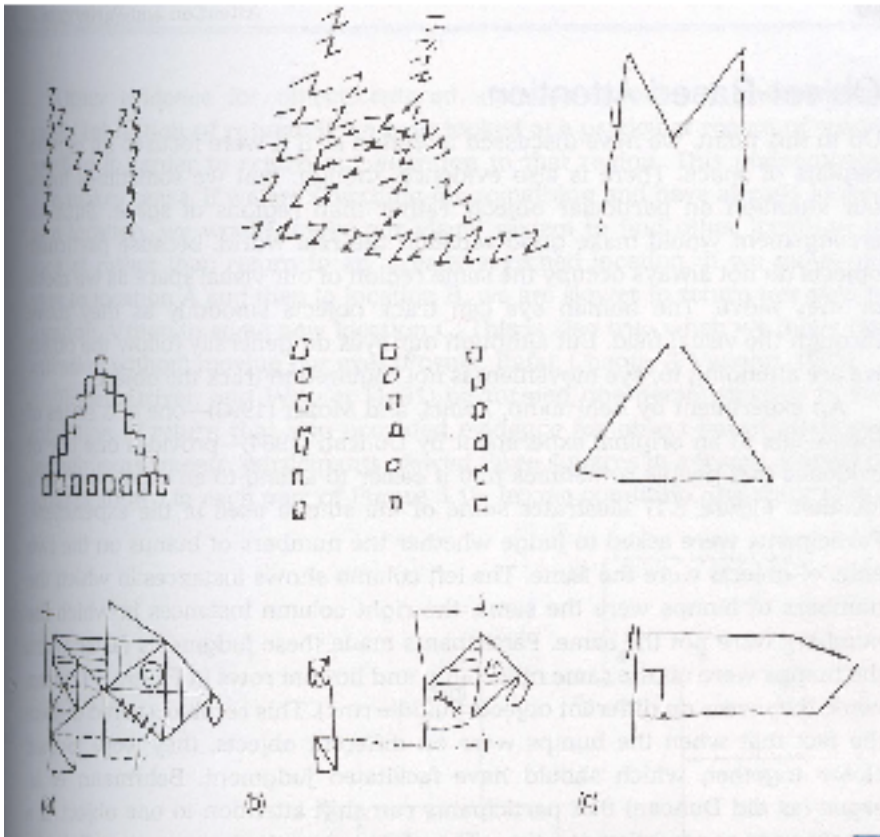
Neglect of the Visual Field

right vs. left parietal lobes

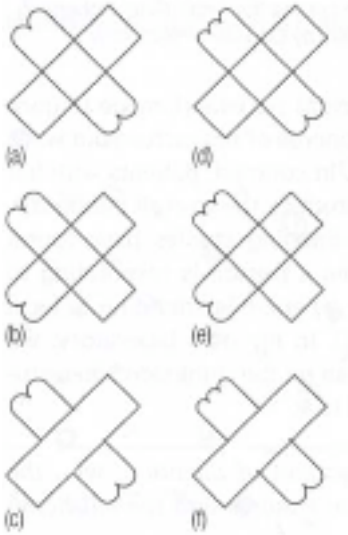
Robertson & Lamb, 1991

left - detail

right - shape



Object-based Attention
Behrmann et al., 1998



inhibition of return
Tipper et al., 1991

Central Attention

task/time sharing

task analysis

automaticity

Stroop Effect (1935)