Katedra psychologie

ATTENTION

Jiří Lukavský

Attention

Attention

- Selectivity
- 2 stages
  - Focusing
  - Concentration
- Formal function

Covert vs overt attention

Covert attention

- Based on orienting response (Pavlov)
- Bottom-up process
  - new, intensive, surprising, dangerous stimuli
  - connected with needs

Overt attention

- Conscious intention
- Requires effort
- Top-down process

Attention - properties

- Selectivity
  - Enhancement and suppression
- Concentration
  - Intensity vs quantity
- Distribution
  - More stimuli/activities, automatic processes
- Capacity
  - 7±2 (G.E.Miller), 4-5 chunks/objects
- Stability
  - Tracking one object, fluctuations

Theories – model situations

Passive recipient

- Multiple signals, one preferred

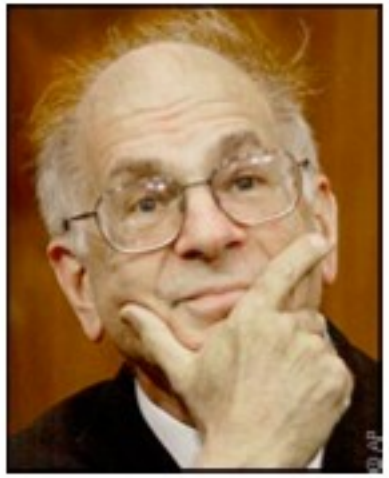
Agent

- Multiple activities performed simultaneously

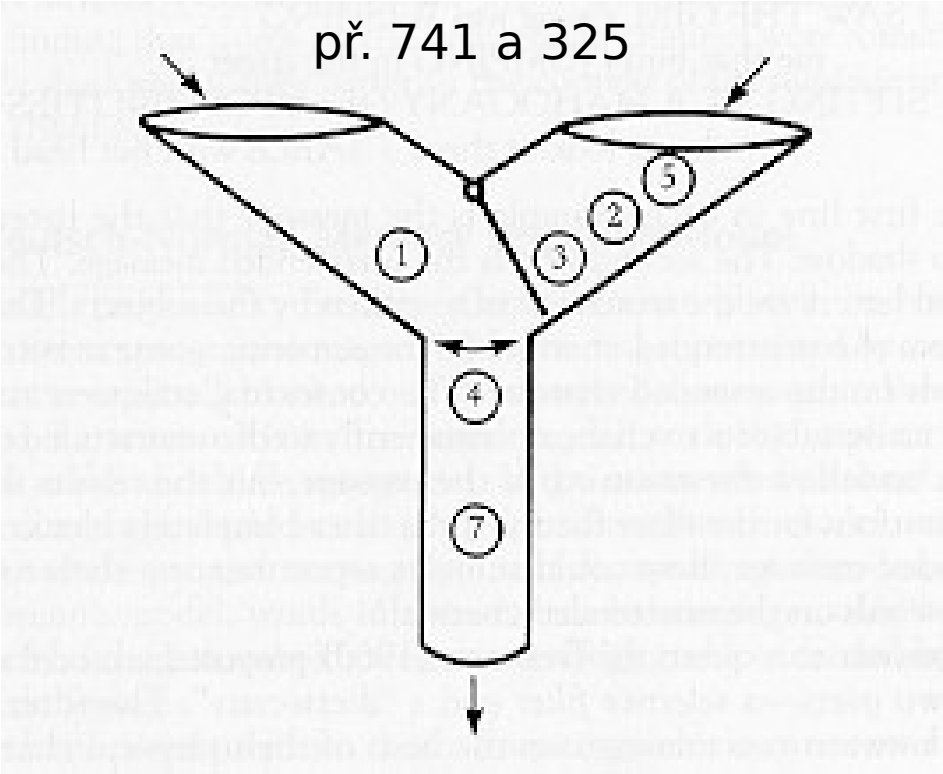
Theories of attention

- Filter models
  - D.E.Broadbent
  - A.Treisman
  - Deutsch & Deutsch
  - Johnston & Heinz
- Capacity models
  - D.Kahneman
  - D.A.Norman & D.G.Bobrow



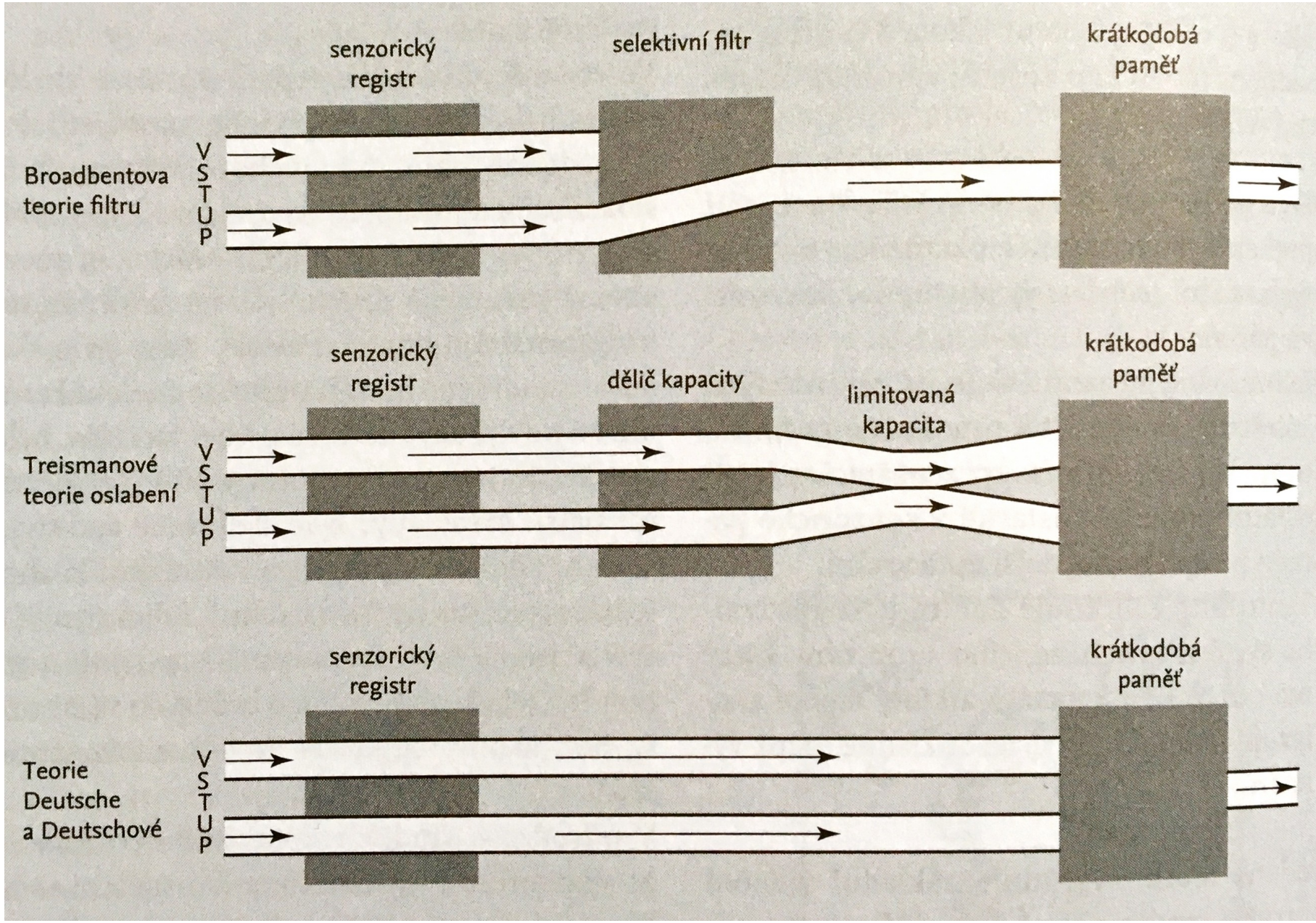
Donald Broadbent



- Dichotic listening
  - Colin Cherry
  - Cocktail party problem
  - Shadowing
- “mechanical model”
  - Balls, priority, force/momentum
  - **Physical properties** of stimuli, early filtering
- Immediate memory

Alternatives

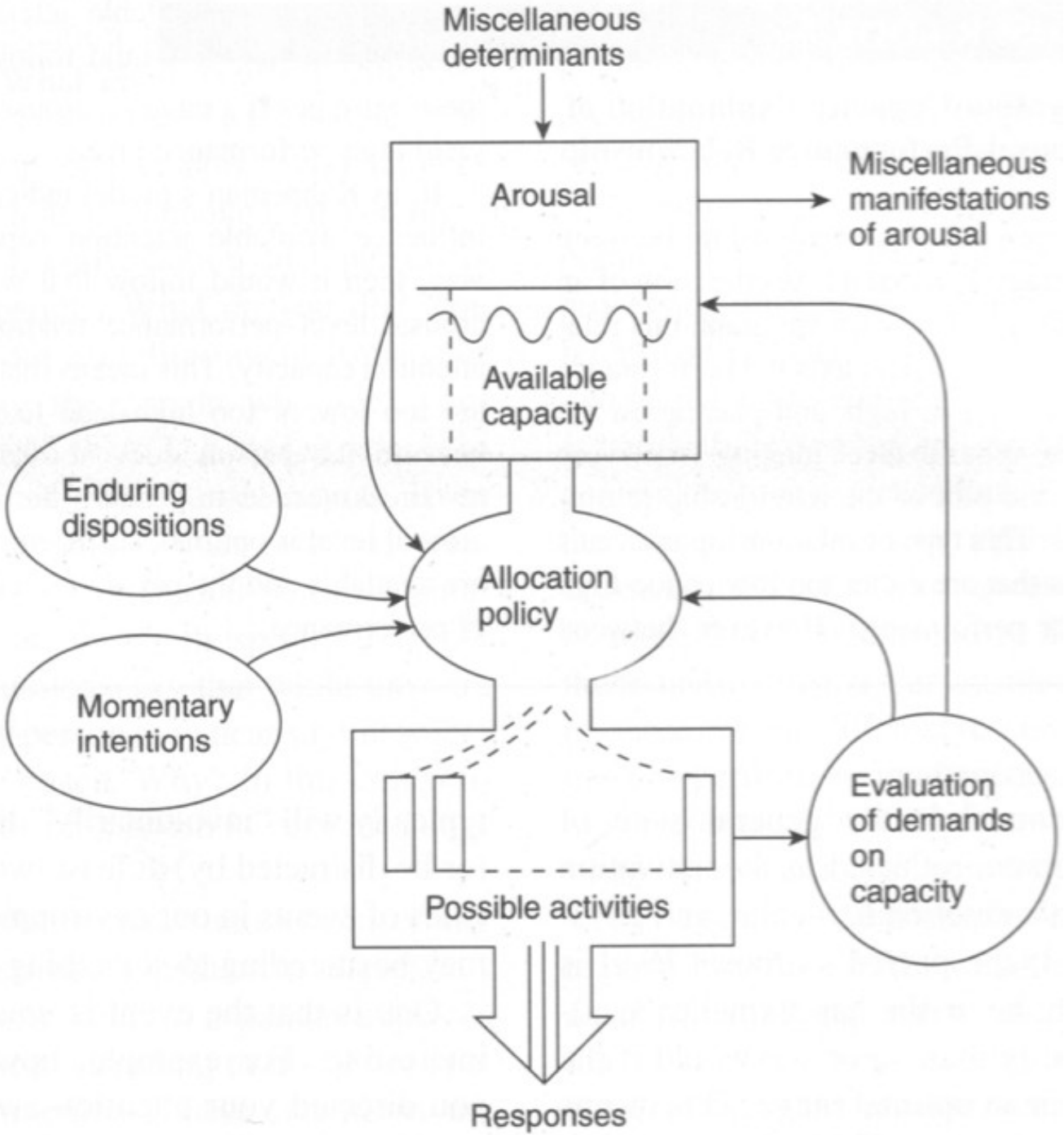
- Attenuation model – A.Treisman
  - Limited capacity
  - Every signal gets some portion
- Late filter – Deutsch & Deutsch
  - Meaning is processed
  - Stimuli selected based on **meaning**
- Flexible model – Johnston & Heinz
  - Selection possible in several stages
  - Early selection saves effort
- Perceptual Load Theory - Lavie
  - We distribute resources based on task-relevance.
  - Remaining resources may be used for other things


Broadbentova teorie filtru
VSTUP
senzorický registr
selektivní filtr
krátkodobá paměť
Treismanové teorie oslabení
VSTUP
senzorický registr
dělič kapacity
limitovaná kapacita
krátkodobá paměť
Teorie Deutsche a Deutschové
VSTUP
senzorický registr
krátkodobá paměť

Capacity model

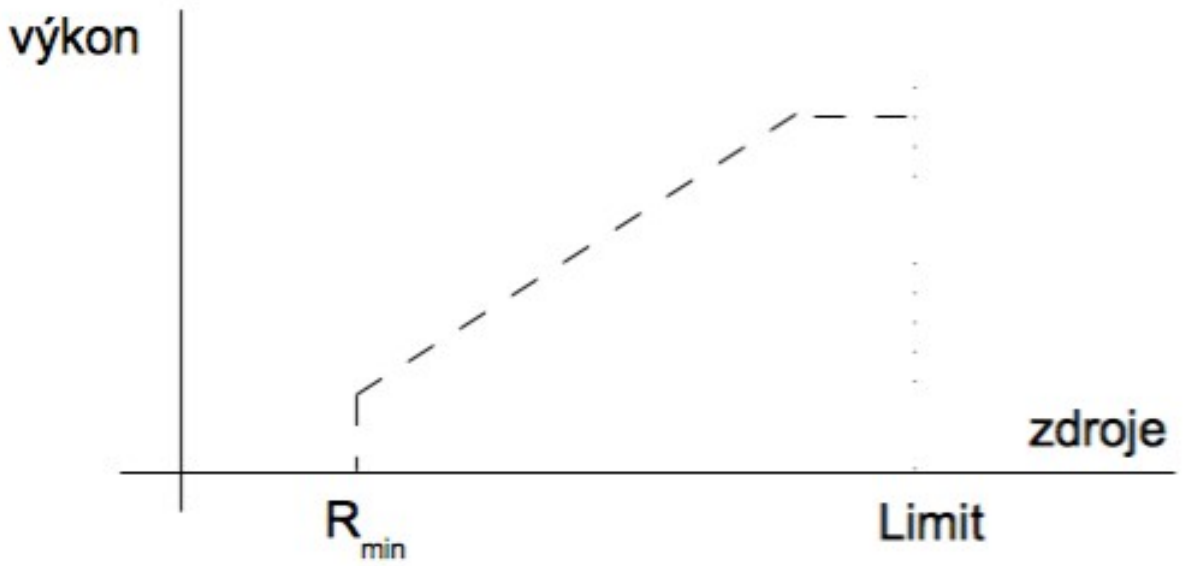
- D.Kahneman (1973)

- Dual-task method
- Interference
  - Receptors/effectors

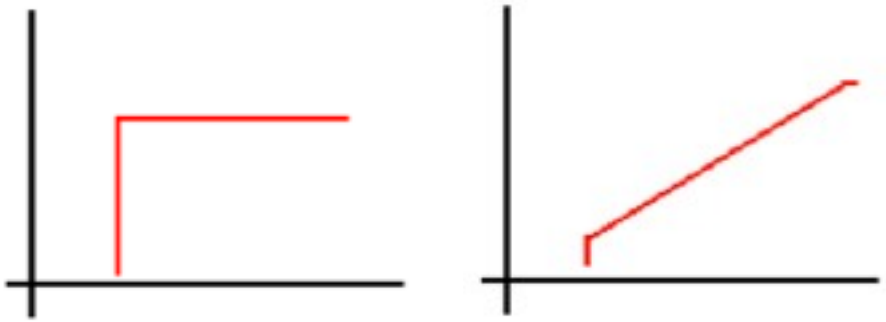


Resources and performance

- D.A.Norman & D.G.Bobrow



- Data-limited vs Resource-limited processes
  - DLP – notice phone ringing
  - RLP – mathematical tasks



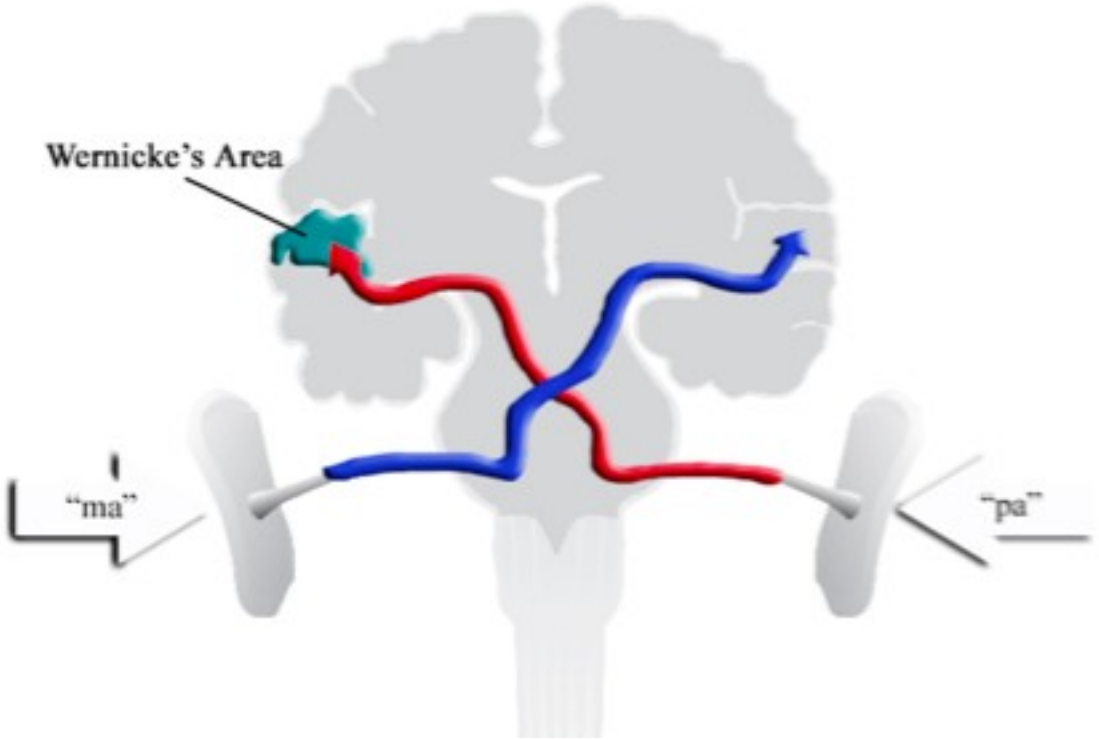
Methods and approaches

- Auditory attention
- Visual attention
  - Eye movements
  - Salience
  - Feature integration theory

Auditory attention

- Cocktail party effect

- Shadowing task
- Dichotic listening

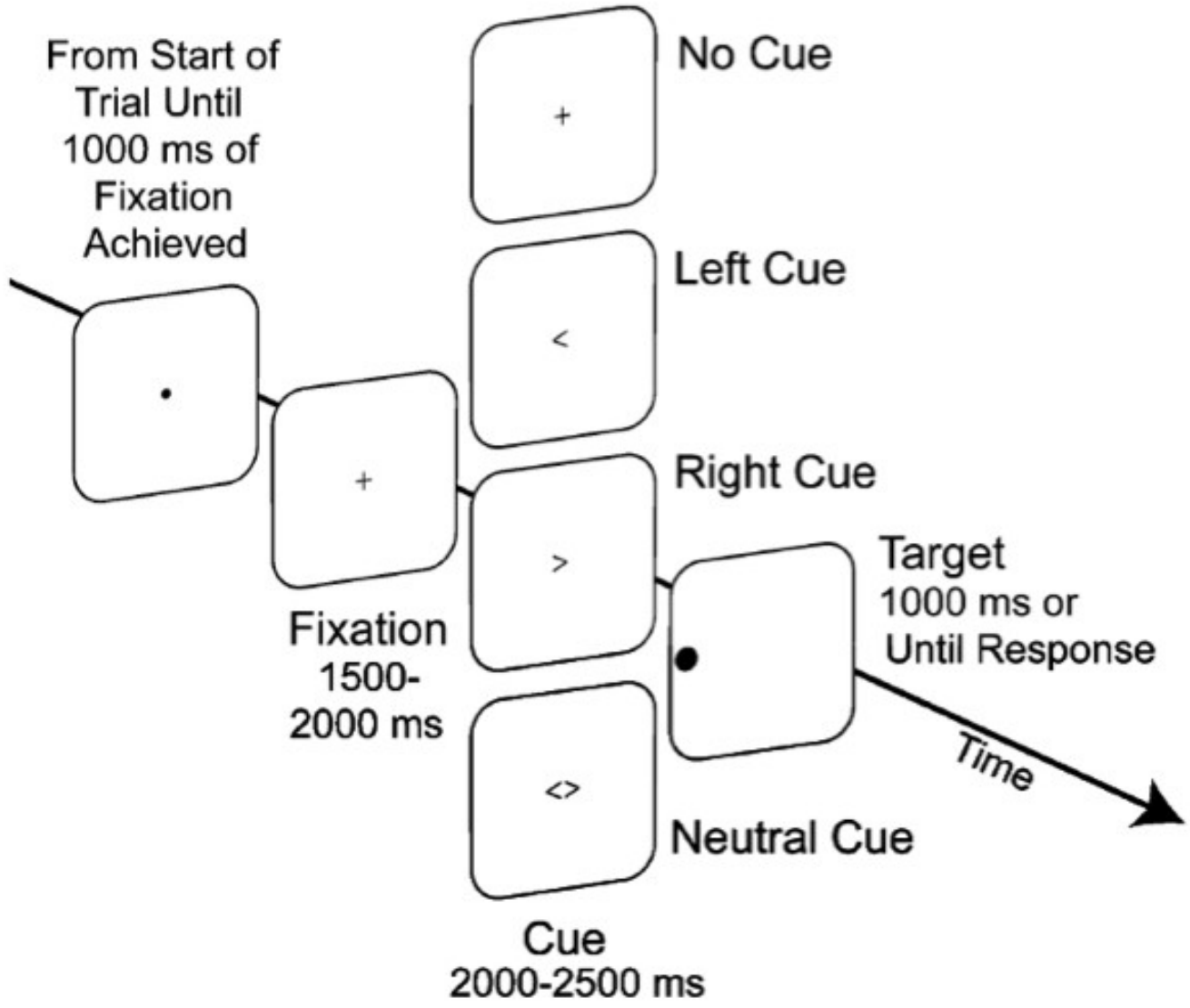


Visual attention

- Overt attention
  - Eye-tracking
  - Scan-paths, task dependent
- Covert attention
  - Salience
- Visual search

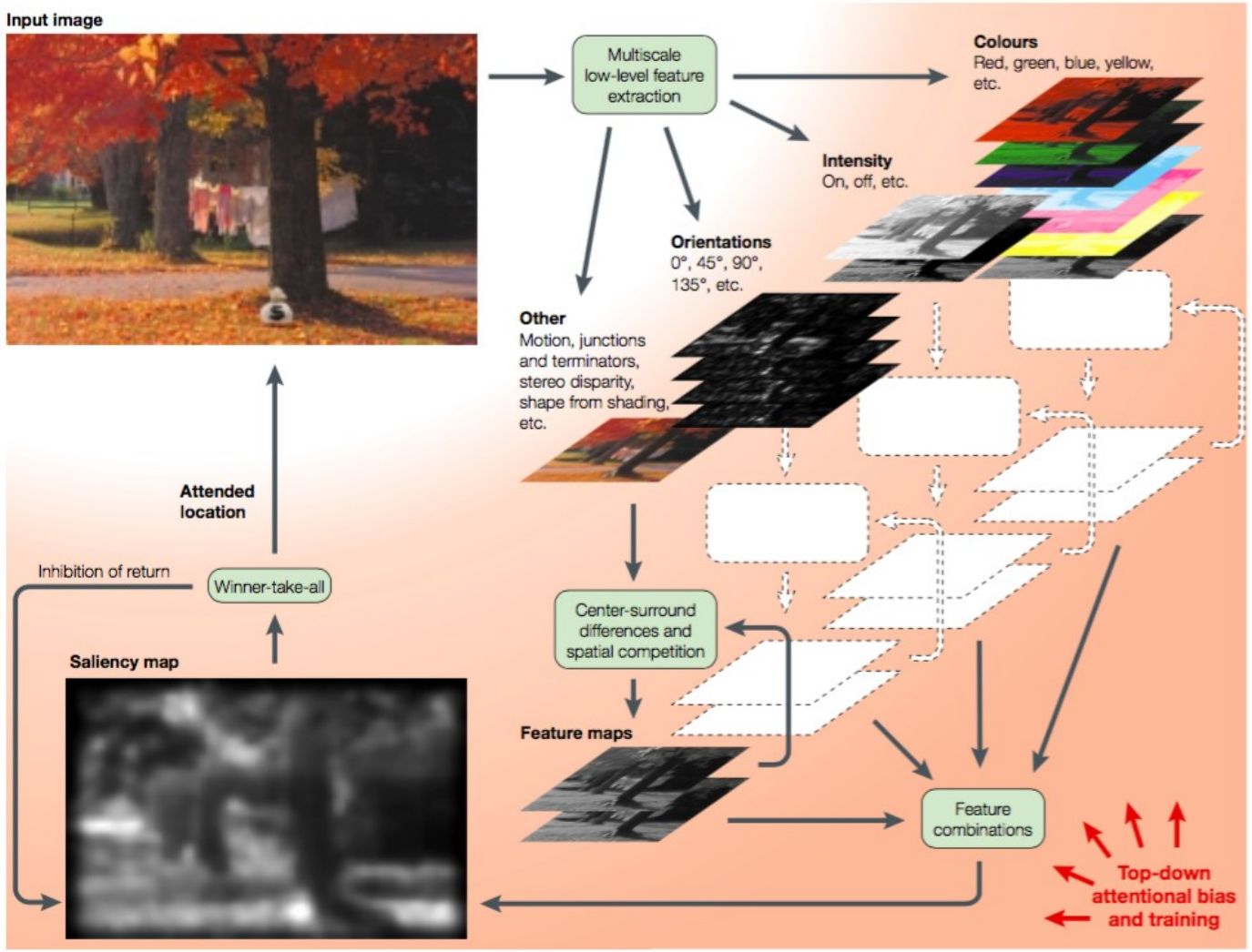
Attentional cueing

- Attention without foveation
- Posner et al. (1978)



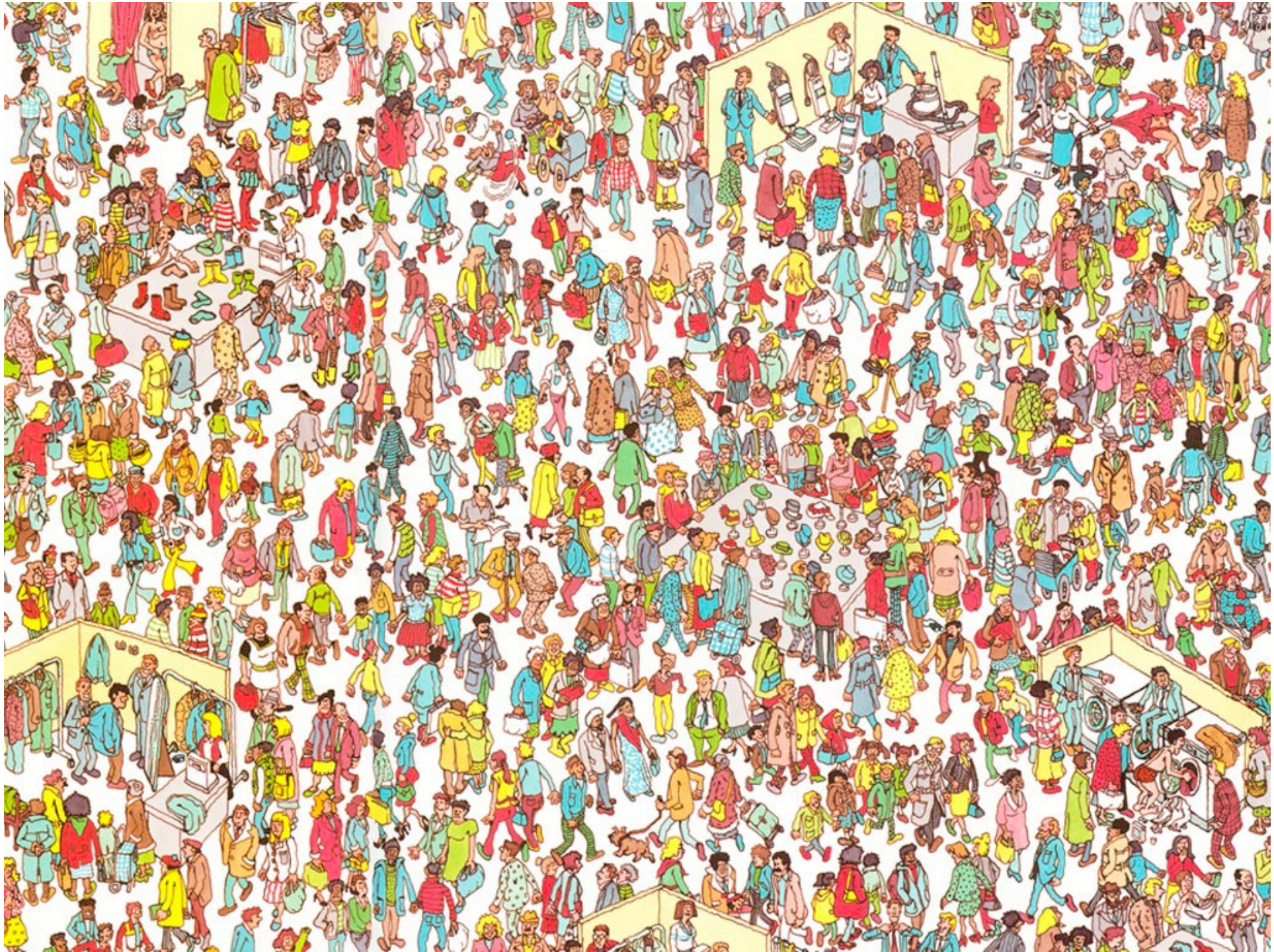
Covert pozornost

- What attracts attention
  - **Salience** (výraznost)
- Koch and Ullman, 1985 (p. 221): “Saliency at a given location is determined primarily by how different this location is from its surround in color, orientation, motion, depth etc.”
- https://youtu.be/zeFCYvwbIGU



Visual search

- “Where is Waldo”



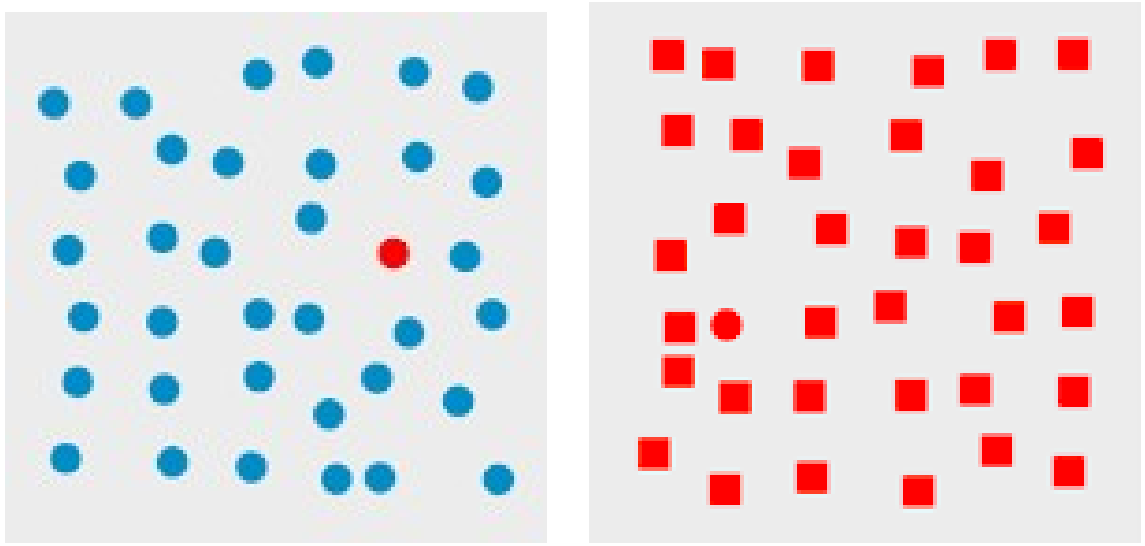
Feature Integration Theory
Treisman & Gelade (1980)

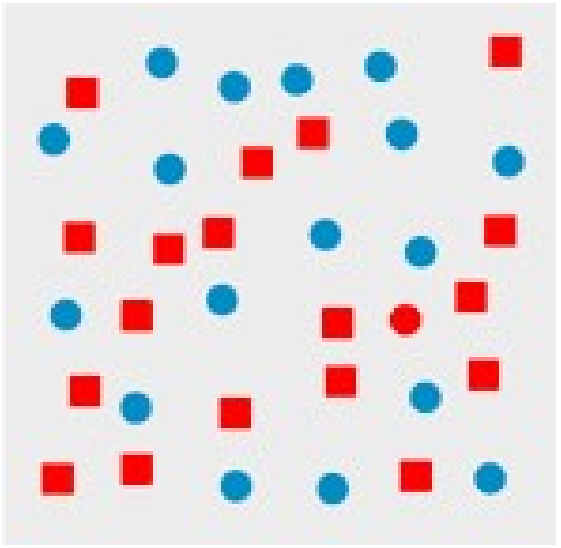
Pre-attentive processing

- Parallel processing
- Feature search

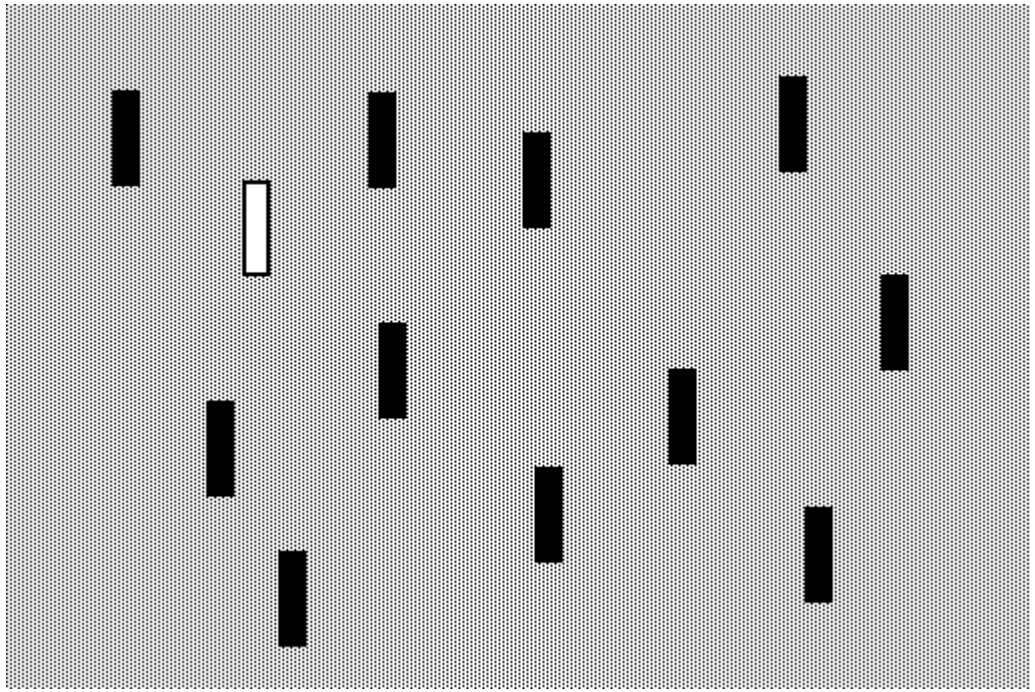
Focused attention

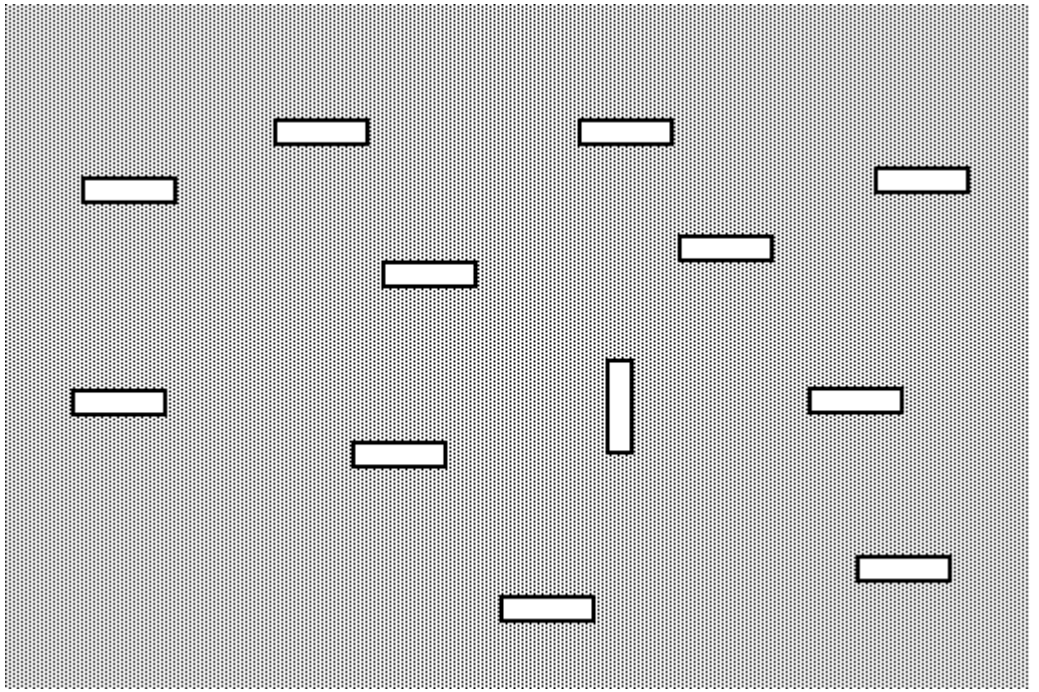
- Serial processing
- Conjuction search





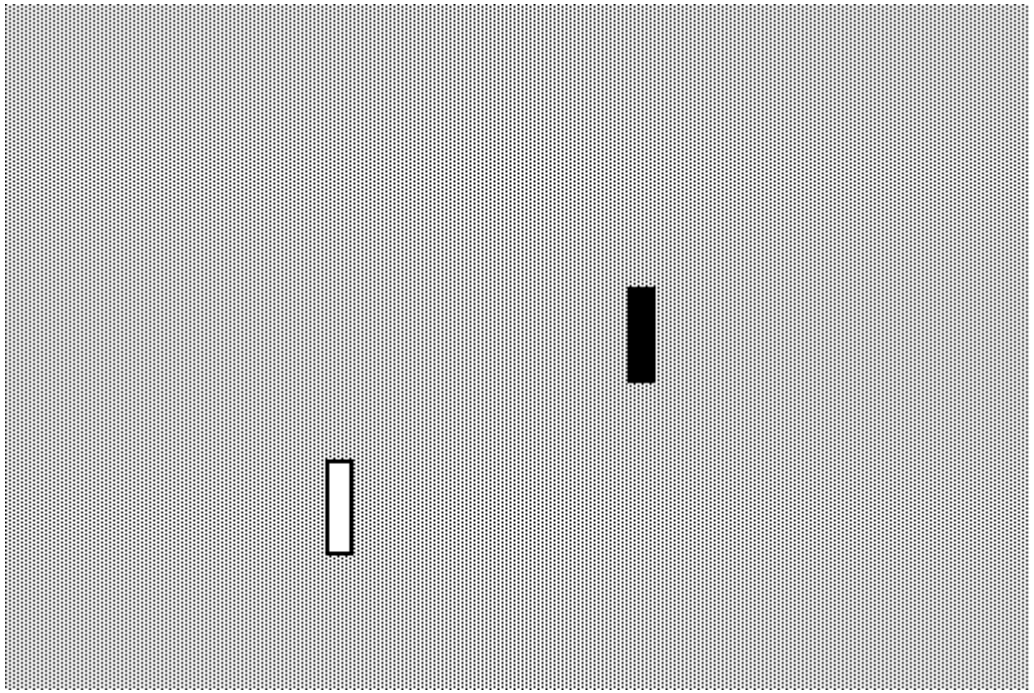
Feature search

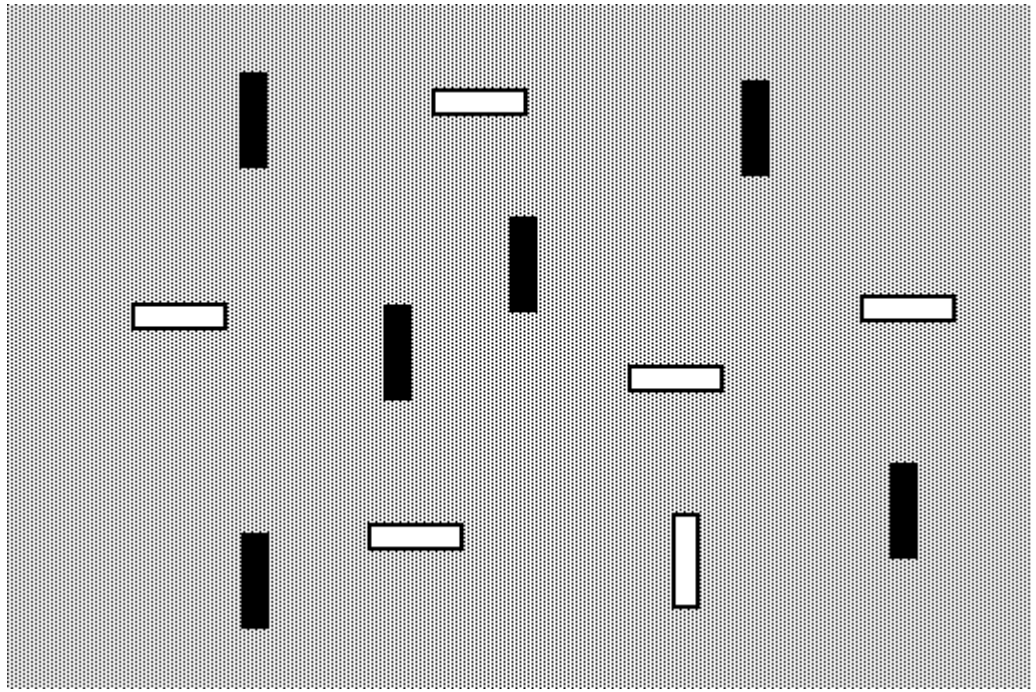


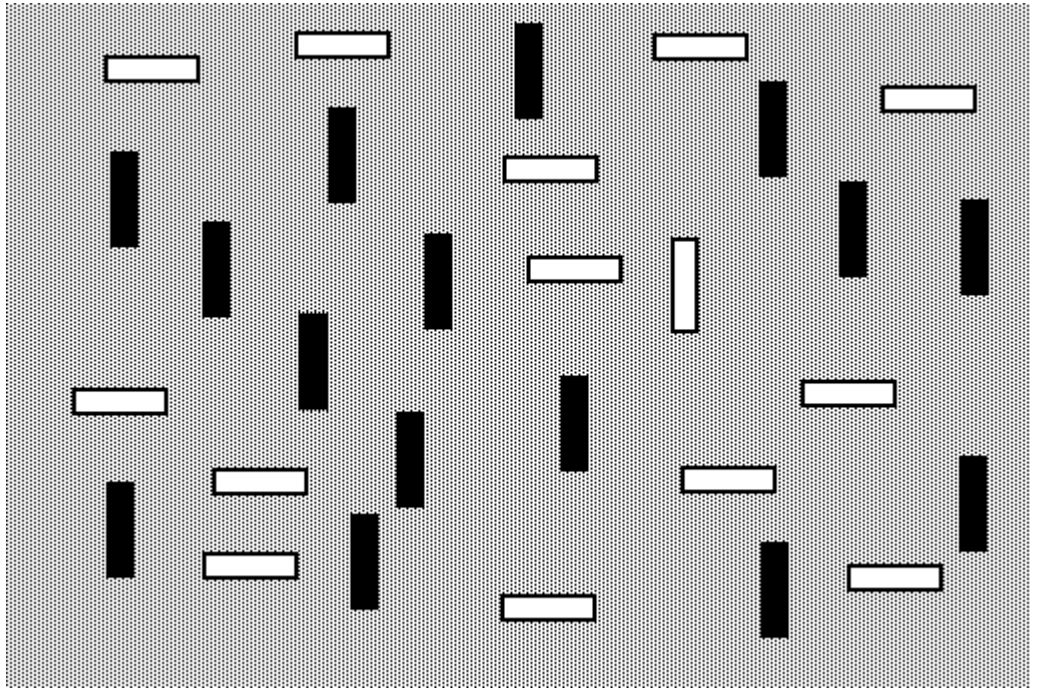


Conjunction search

- Set size effect

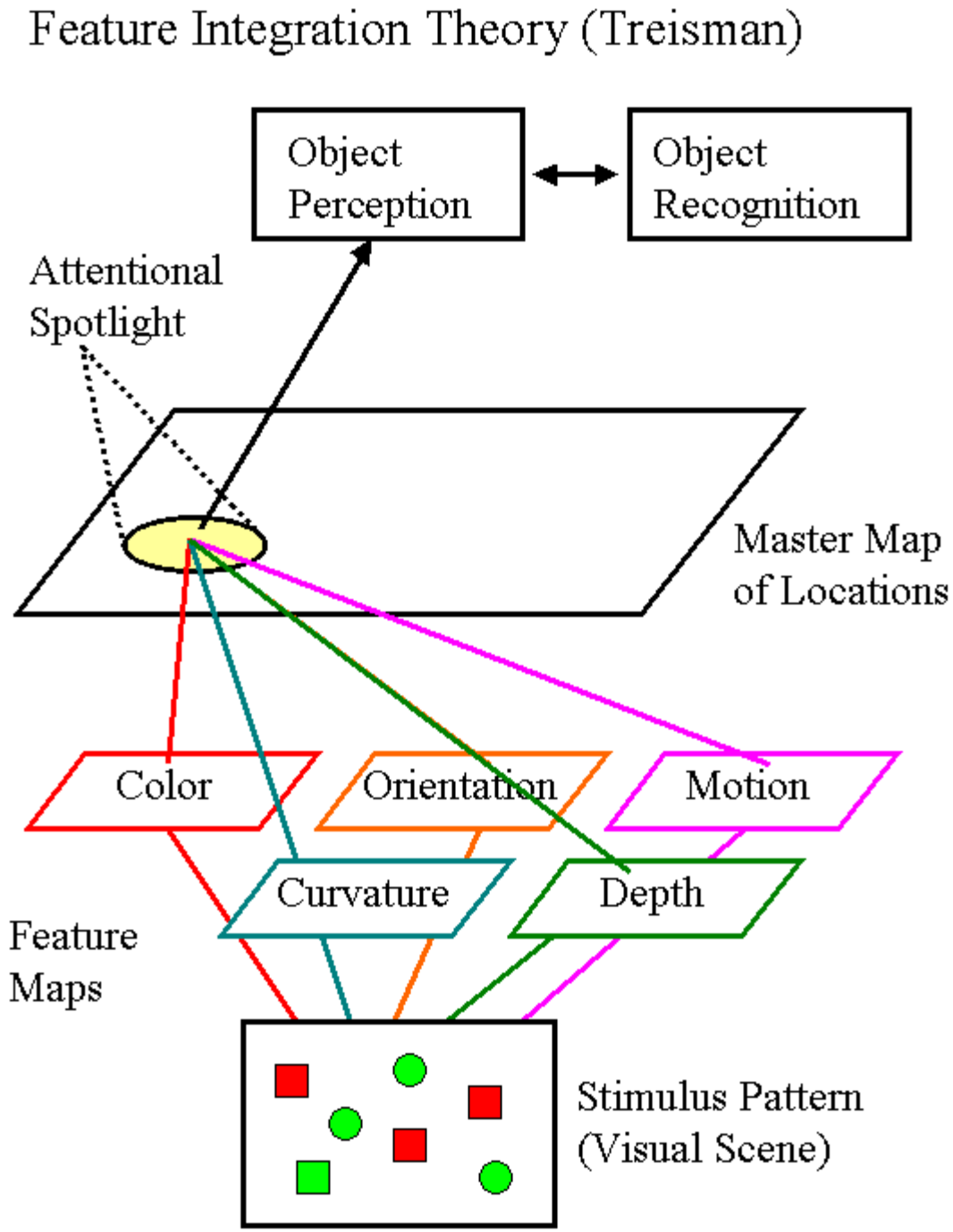






Feature Integration Theory

- Feature maps
- Attentional spotlight



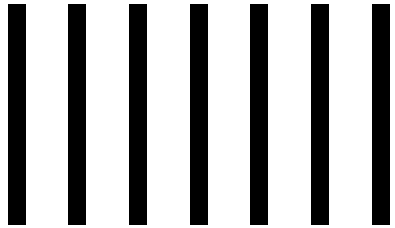
Attention and scene perception

- Inattentional blindness
- Change-blindness

Attention – resolution in space and time

- Space
  - Crowding
  - Multiple Object Tracking
- Time
  - Attentional blink

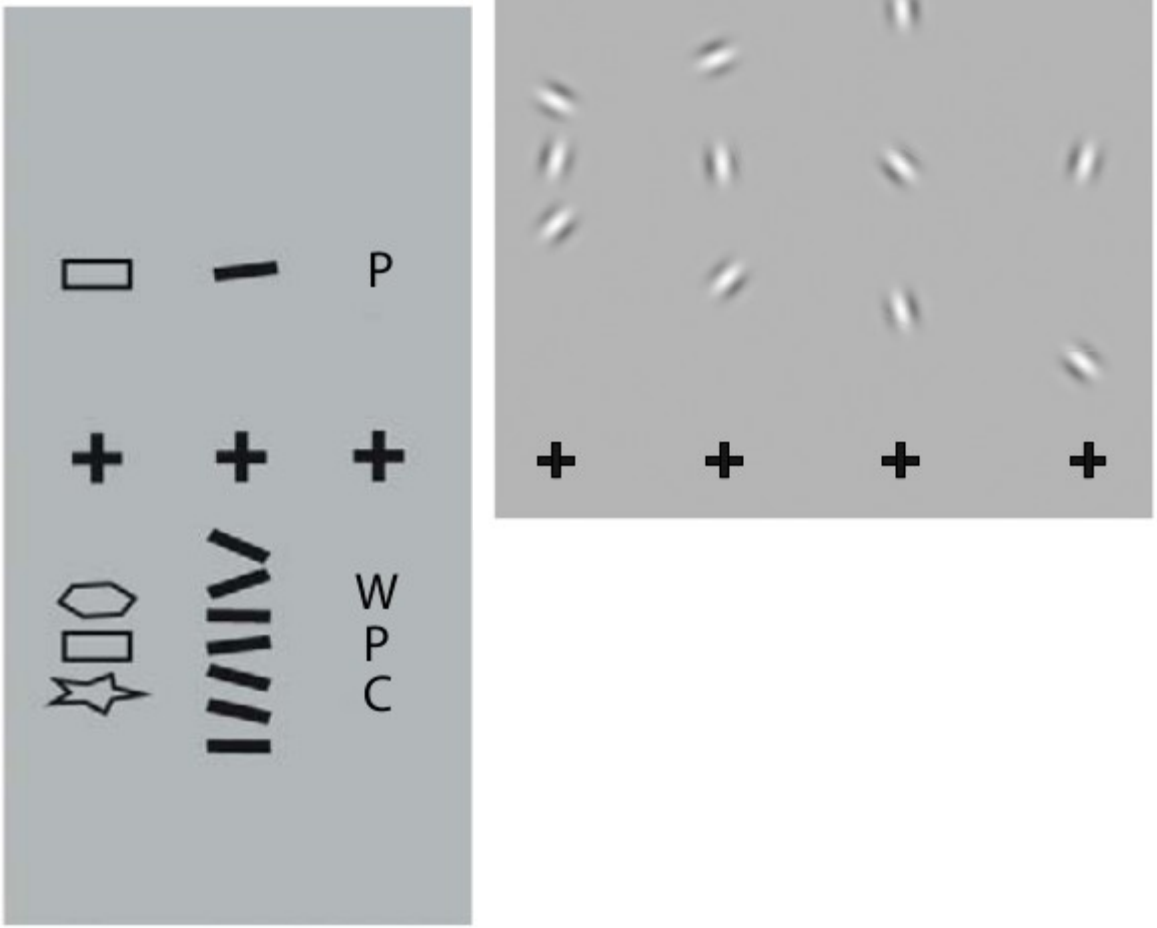
Crowding

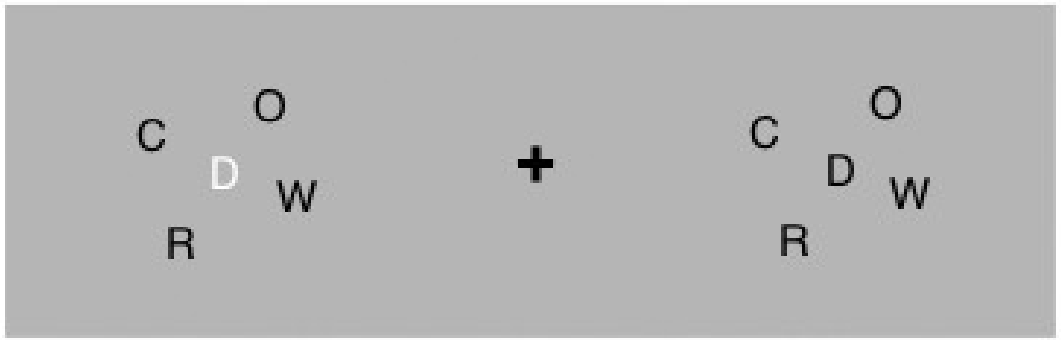


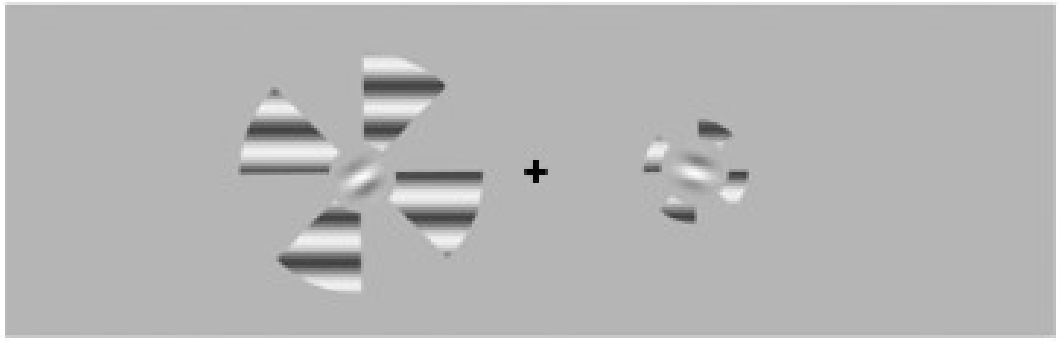
Crowding

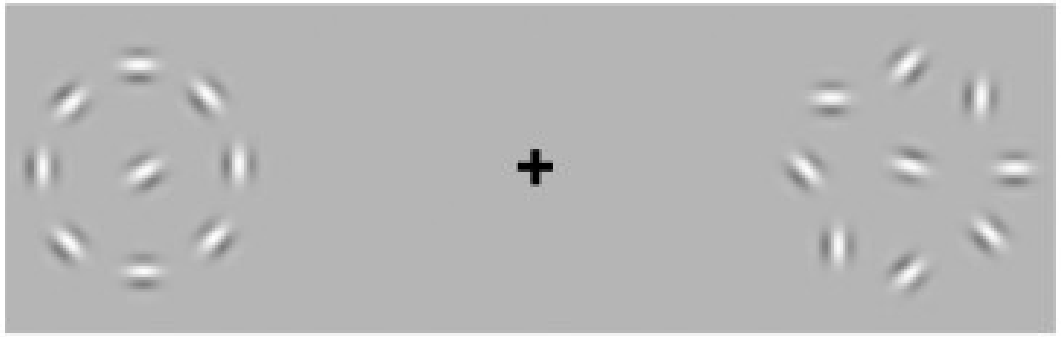
(a)

Crowding



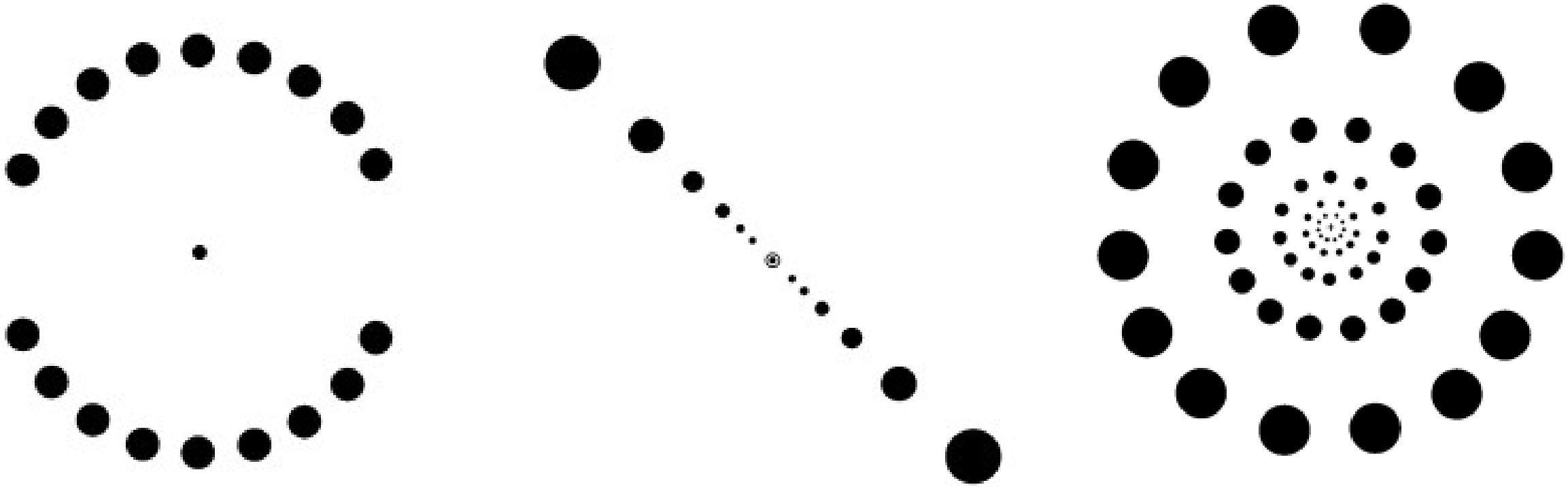






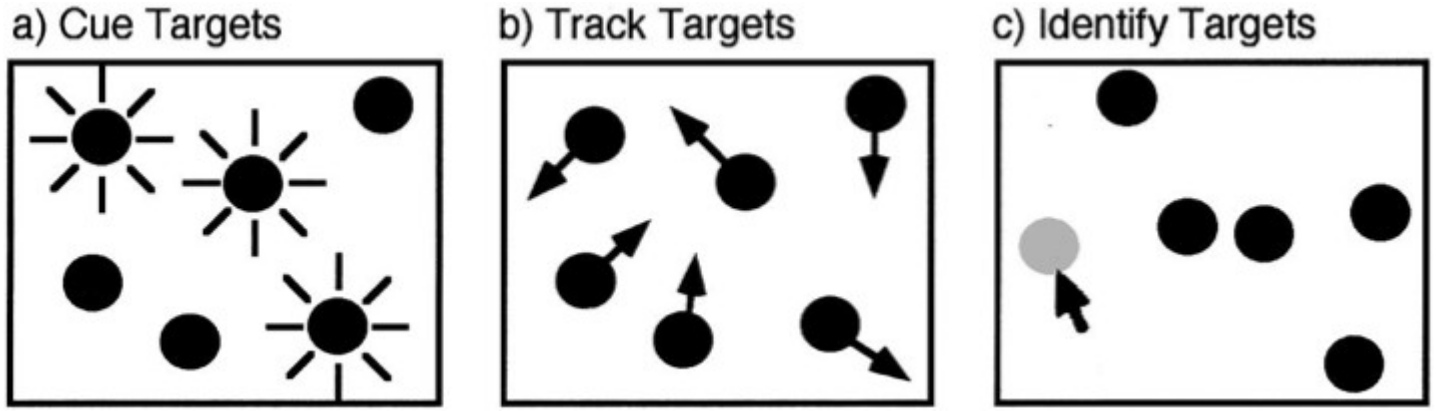
Resolution in space

- Intriligator & Cavanagh (2001)



Distributed attention

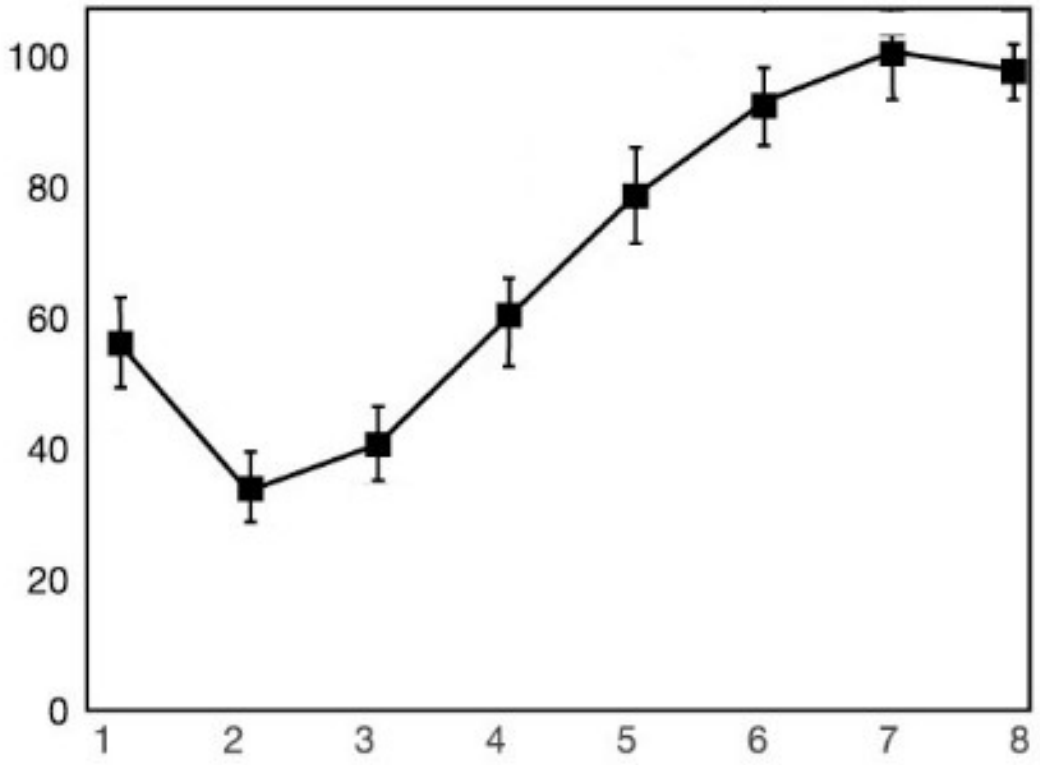
- Multiple Object Tracking

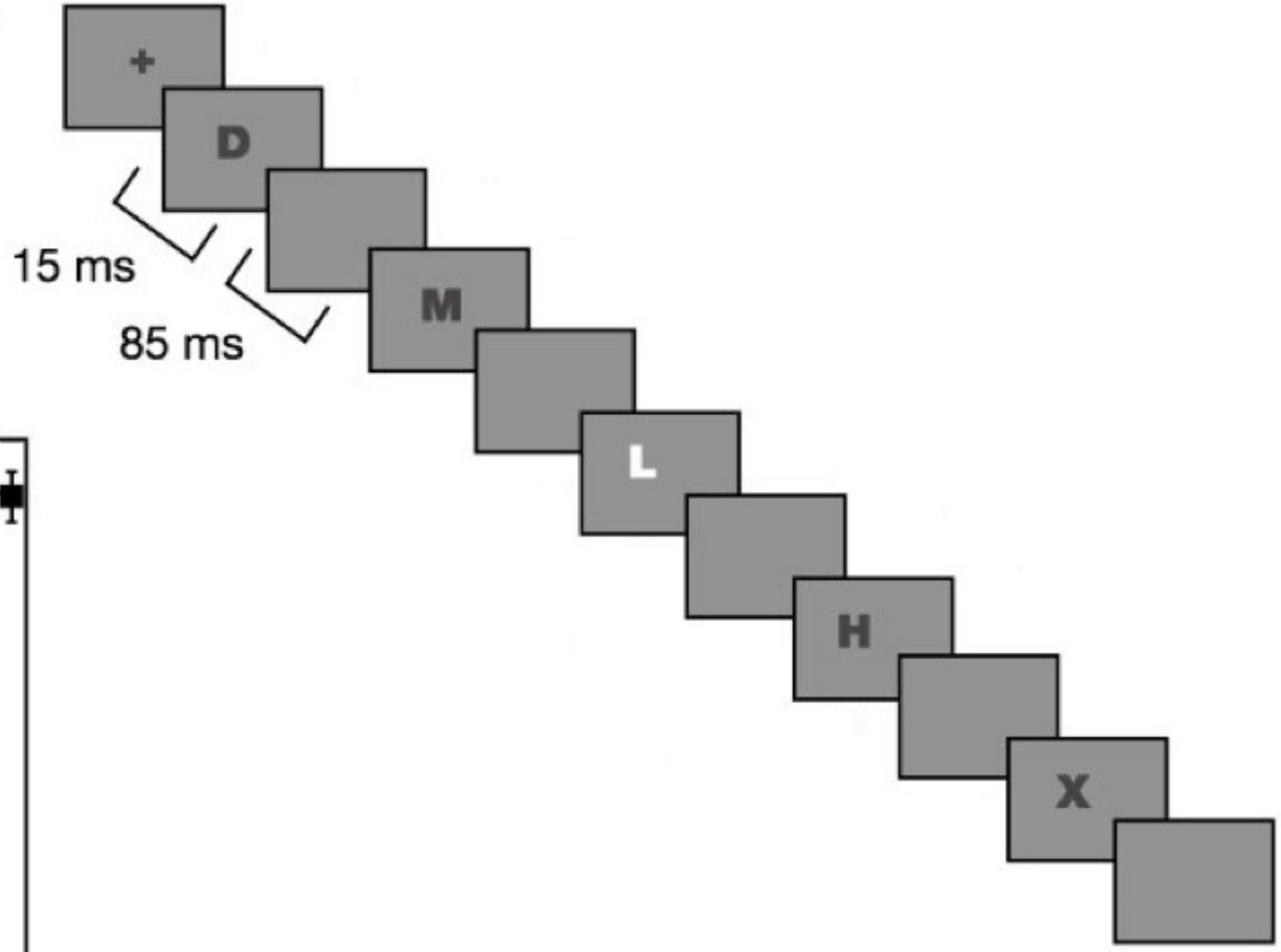


- https://youtu.be/lAQM4QJRYV8

Attention in time

- Attentional blink





Demo: https://youtu.be/MH6ZSfhdIuM

Czech textbooks

- Kognitivní psychologie (Eysenck) - 5. kapitola/Pozornost a hranice výkonu