PSI 428
Attentional Processes

Divided Attention

Learning Objectives

- **What is divided attention**
- **Serial vs. Parallel Processing**
- Taking in Information from Brief Visual Displays
- Simultaneous vs. Sequential Presentations
- Article Presentation
- Speeded Visual Search
- Article Presentation

Divided Attention

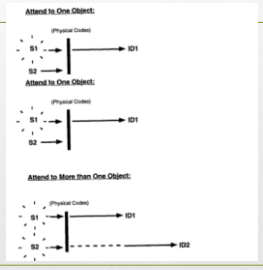
- "What happens to when a person take in sensory information from several sources at the same time?"
- "Are perceptual system(s) limited in their ability to handle multiple inputs?"
- The most extreme form of this limitation is serial processing
- The most extreme form on the other end of the continuum is unlimited parallel processing

Capacity Limitations

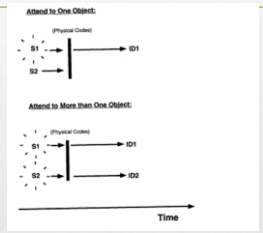
- In an information processing system, capacity limitations exist if processing efficiency of a stimulus is reduced when other stimuli are processed the same time.

Capacity Limitations

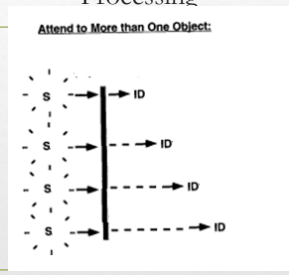
Serial vs. Parallel Processing



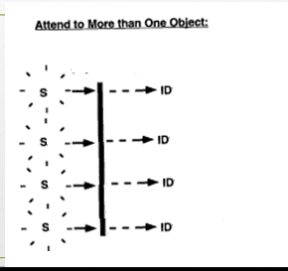
Serial vs. Parallel Processing



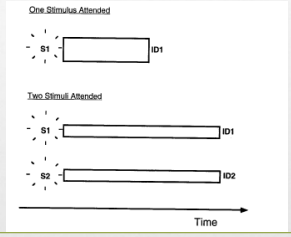
Capacity Limitations in Serial Processing



Capacity Limitations in Parallel Processing



Capacity Limitations in Parallel Processing



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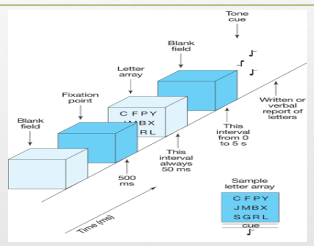
Full vs. Partial Report Tasks

T D R
S R N
F Z R

- How much visual information people can recognize in a briefly exposed scene?
  - What are the predictions of serial and parallel processing accounts of divided attention.
  - What should be the design of the experiment?

Diagram of a Trial in Sperling's Study



SHORT TERM STORAGE OF INFORMATION IN VISION

E. Averbach and G. Sperling*
Bell Telephone Laboratories, Inc., Murray Hill, New Jersey, U.S.A.

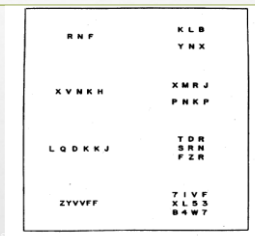


Figure 1

SHORT TERM STORAGE OF INFORMATION IN VISION

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stimuli were exposed for 50 msec (1/20th sec) individually

Figure 2 shows the average number of letters that subjects were able to report correctly. The subjects reported nearly all the letters correctly so long as the number of letters in the stimulus did not exceed five. When stimuli contained five or more letters, subjects were able to report only

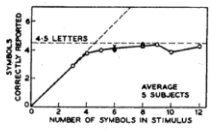

Figure 2

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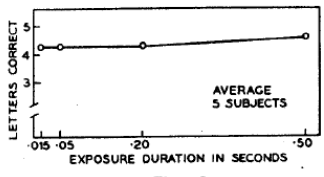
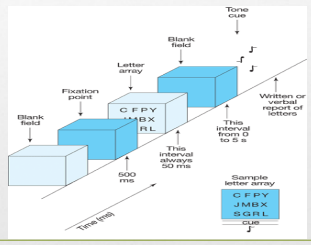


Figure 3

Diagram of a Trial in Sperling's Study



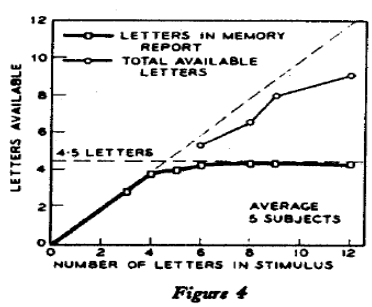


Figure 4

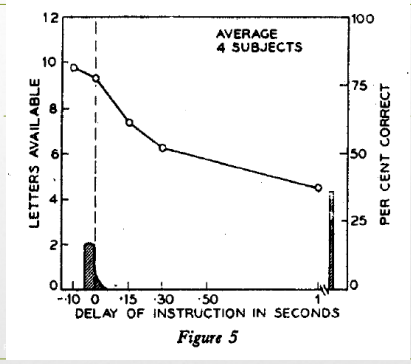


Figure 5

Full vs. Partial Report Tasks

- Do these results support parallel or serial processing of information?

Full vs. Partial Report Tasks

- Iconic memory is an unlimited capacity system that can hold information only in short durations
- They can transfer selected subset of information to the short-term memory
- Short-term memory is a limited capacity system that can hold information longer durations

Issues to be Resolved

- People cannot hold more than 4-5 items long enough to report them
- People can recognize more items than they can report

Estes, W. K., & Taylor, H. A. (1966). Visual detection in relation to display size and redundancy of critical elements I. *Perception & Psychophysics*, *1*(1), 9-16.

Searching Brief Displays

- Method: Participants searched the entire display to report presence of only a single character
- Participants reported whether one of the target letters (C or F) was present in the display

T D R K
S R N B
L Z C R

Estes, W. K., & Taylor, H. A. (1966). Visual detection in relation to display size and redundancy of critical elements I. *Perception & Psychophysics*, *1*(1), 9-16.

Searching Brief Displays

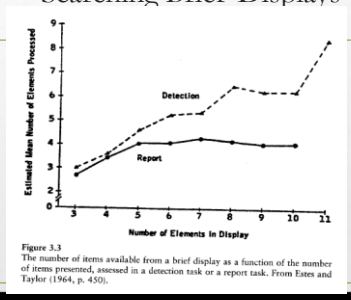


Figure 3.3
The number of items available from a brief display as a function of the number of items presented, assessed in a detection task or a report task. From Estes and Taylor (1964, p. 450).

Estes, W. K., & Taylor, H. A. (1966). Visual detection in relation to display size and redundancy of critical elements I. *Perception & Psychophysics*, *1*(1), 9-16.

Searching Brief Displays

- **Conclusion**: The amount of processing people can perform on a brief display is underestimated by the report procedure.
- People can identify more stimuli than they can report.
- Do these results support parallel or serial processing of information?

Searching Brief Displays

- The basic strategy of these type of studies:
  - "How accuracy suffers when observers are forced to monitor greater number of channels"
  - "Number of assumptions must be made on the nature of processing and nature of decision making"