ATTENTION!
(SPECIFICALLY, SELECTIVE ATTENTION)

Chapter 4
Quiz

• What is dichotic listening procedure? What is the shadowing procedure?
• What is the cocktail party effect and what does it tell us about attention?
Controlled attention

• Deliberate, voluntary allocation of attention

• *Selective attention*: attend to one source, *ignore* other sources
  • Attention metaphor: filter

• Selective attention methods
• Real world examples
Selective attention: Visual tasks

- **Visual search**
  - Conjunctive task (search for combo of 2 features)

- **Stroop task**
  - Dual-component stimuli (color and word)
  - Instruction: say color of ink

- **Simon effect**
  - See CogLab demo if interested!

- **Flanker compatibility task**
  - Attend to center of display, ignore sides (“flankers”)
  - Instruction: say if target is present or not
Flanker compatibility task

- Compatible flankers:
  - Target and distractors lead to same response

- Incompatible flankers:
  - Target and distractors lead to opposite responses

- Neutral flankers:
  - Distractor is not connected to a response so only target provides response info

- Lavie (2005)
  - IV: load (low-load vs high-load ease of finding target)
  - Result: distractor has more effect in low load condition than high
  - Conclusion: Ability to ignore task irrelevant info depends on cognitive resources available and power of stimuli to capture attention
Selective attention: Auditory tasks

- **Dichotic listening**
  - 2 auditory messages: 1 in each ear
  - Task: to attend to 1 ear

- **Shadowing task**
  - Dichotic listening
  - Task: repeat content of 1 ear
Early selection findings

• Cherry (1953) dichotic listening findings
  • Don’t notice language or content of 2\textsuperscript{nd} message
  • Do notice gender of 2\textsuperscript{nd} message

• Broadbent (1958)
  • “Split scan” method: Hear digits simultaneously in right/left ear
    • Recall items in any order or in pairs
  • Results: Report any order
    • Recall digits from one ear then other – 65% accurate
  • Results: Report in pairs
    • Forced to switch – 20% accurate
Broadbent’s Filter Model of Attention

- Bottleneck model: restricts info available
- Filter selects info based on physical characteristics
- Early selection theory
Evidence against Broadbent’s model

Moray (1959)

• **Method:**
  • Shadow 1 ear
  • Name said in unattended message

• **Results/Conclusion:**
  • 1/3 hear name = “Cocktail party effect”
  • Name not filtered so analysis of unattended message goes beyond physical characteristics

Gray & Wedderburn (1960)

• **Method:**
  • Shadow ear: “dear 7 Jane”; unattended ear: “9 Aunt 6”

• **Results:**
  • Ss report hearing in shadowed ear “dear Aunt Jane”
Treisman (1960)

- Treisman (1960) results:
  - Attention *can* switch with message meaning
  - Unattended message “reduced”
Treisman’s attenuation theory

- 2-stage process:
  - Attenuator: Analyzes physical characteristics, language, and meaning
    - Analyze as much as needed to separate the messages
    - Leaky filter model
  - Dictionary unit: Decide if a word reaches threshold
    - e.g. listeners name as low threshold
  - Early selection theory (b/c filter early in processing)
Norman’s Pertinence Model

- Selection based on
  - Sensory information
  - Pertinence
- Highest combination gets attention
- Continuous process
- Late selection theory
MacKay (1973)

- **Method**
  - Ambiguous sentence in attended ear
    - “They were throwing rocks at the bank.”
  - Bias word in unattended ear
  - Which test sentence closest in meaning

- **Result**
  - Bias word influences sentence meaning

- **Conclusion**
  - Unconscious processing of meaning of unattended information
  - Support for late selection
Early vs. Late selection

- How much is processed before selected?
- Where does selective attention operate?

- Early: filter at physical (sensory) analysis (fig a)
- Late: filter at/after semantic analysis (fig b)

Figure 3.5 Treisman and Geffen’s illustration of attentional limitations produced by (a) Treisman’s (1964) attenuation theory and (b) Deutsch and Deutsch’s (1963) late-selection theory. (From Treisman & Geffen, 1967. Reprinted by permission of the publisher. © 1967 by the Quarterly Journal of Experimental Psychology)
Johnston and Heinz (1978)

- Attention is flexible.
  - Selective attention can operate in multiple modes (early, middle, late).
  - But, later selection uses more of our limited attentional capacity

- Trade-off:
  - Stage of processing VS. capacity
  - Time and accuracy

- Experiment method:
  - Dual-task: shadow 1+ messages plus light detection
  - Messages differ physically or in meaning, or both
Johnston and Heinz (1978)