Models of Attention: Filter and Limited Resource Models

Lesson III: Attention module 14
Case of selective attention: Shadowing

... 1 A M 4 5 7 ...

... 4 6 F G 2 Q ...

... 1 A M 4 5 7 ...
Three classes of models (not mutually exclusive)
- Filter models of attention
- Neisser’s pre-attentive and attentive processing
- Limited resource models of attention

Filter models
- differ in their assumptions on how far unattended information is processed
- Early vs. late filter models

Limited resource models
- differ in their assumptions about the number of resource pools available
- Single pool or multiple modality-specific pool
**Information is blocked early for unattended channel**

- Information is filtered at an early, sensory level
- Only 1 channel of sensory information proceeds through this filter (bottleneck) and is interpreted
- Other stimuli with salient sensory characteristics can also pass through this filter
Filter theory: Early selection

- **Characteristics of the model**
  - Information is filtered at an early, sensory level
  - Only information in 1 channel can proceed (bottleneck)
  - Only this information is interpreted
  - Other stimuli with salient **sensory** characteristics can also pass through this filter

- **Evidence**
  - Not much is remembered about the unattended information

- **Problems**
  - Moray’s finding that people recognize their name in the unattended channel
  - Treisman’s finding of semantic processing of the unattended message (e.g., semantic continuity)
What’s processed in the unattended channel?

While you are sitting in class you might learn a / that might not be good for your skin ... 

On the beach you can bath in the sun but / piece of information that is relevant ...

While you are sitting in class you might learn a / ... piece of information uh ... that might not be good for your skin ...
Information is attenuated differentially for channels
- A filter determines how much information from each channel is being processed
- Perceptual processing is limited in capacity
- This model allows for highly relevant information to be interpreted, even if the channel is not attended to
Deutsch & Deutsch (1963): Late Selection

Information from all channels is perceptually processed
- Selection occurs late, after perceptual processing has interpreted the stimulus
- Processing bottleneck occurs when items have to be placed in short-term memory
Neisser’s (1967) “two stages” view

- **Preattentive processing**
  - Automatic, fast, parallel
  - Mainly analysis of physical characteristics
  - Limited semantic processing (e.g., one’s name)
  - No deep semantic processing / analysis
  - Some initially attentive processing can get automatized through extensive practice
  - Is the basis for perceptual grouping

- **Attentive processing**
  - Controlled, slow, serial
  - Requires attentional resources
  - Enables semantic processing and synthesis
Evidence for preattentive processing...

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Read the color words out loud as quickly as possible
The Stroop (1935) effect

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Read the color words out loud as quickly as possible
Preattentive processing
- Reading is automatic for skilled readers
- Doesn’t require many resources
- Can’t easily be suppressed

Reading the words leads to activation of competing verbal responses
- Processing the color leads to activation of the color name (verbal response)
- Processing the letters leads to activation of the word’s phonology (verbal response)
- The conflict has to be resolved at the response selection stage