

9.65 February 11, 2004 Attention I. HANDOUT

1. Attention: What is it? Iconic memory and attentional selection

2. Theories of attention:

a) Filter theories (early selection)

b) Late selection theories

c) Flexible selection

3. Automatic vs. Controlled attention: Stroop demo.

1. Attention: What is it?

Two senses:

- (1) alertness or arousal, awakens
- (2) selective attention: what we'll talk about here

Iconic Memory: The partial report technique

The method for studying this form of visual memory illustrates the effects of selective attention.

The experiment: Sperling, 1960:

Two possibilities:

(1) when you try to report all, you get confused as you report (output interference)

(2) you "know" about all 12 letters (or, at least 9 of them), but the memory holding all that information decays rapidly--nothing to do with "output interference"

How to distinguish? Delay the tone signalling the row: if (1), still get 3 in the row; if (2), you'll lose information with delay.

Delay of tone: Results:

Visual factors (dark versus bright) are involved in the very brief memory:

These and other results suggested that there is a form of visual "persistence"-- **iconic memory**: a very short form of memory that can be processed selectively, showing that attention can be deployed rapidly.

Attentional selection is a gateway to further processing and memory. But what determines what you attend to?

Involuntary selective attention:

Voluntary selective attention: DEMO

WHY do we need to attend selectively?

2. Theories of attention

HOW do we attend selectively? Cherry (1953: MIT in RLE: Research Lab. of Electronics): "the cocktail party problem." Presented 2 messages on headphones and instructed subjects to **shadow** one of the messages [that is, say the words as they were heard]. That is, listeners were to pay attention to one of the messages. **Binaural** (both messages to both heads) harder than **dichotic** (one to each ear).

-Easier to select if there's a PHYSICAL (SENSORY) difference between two channels

-SPATIAL LOCATION

-Little information about NONATTENDED stimuli seems to be processed.

These findings led to the first theory of selective attention:

a. Filter theory of selective attention

Broadbent's (1958) filter theory:

- Initial sensory representation: the **S-store** or sensory store.
- Attention imposes a "physical" filter on selection from S-store information
- The filtered information from the S-store is passed to the **P-store** (perceptual store, which is more stable)...information decays rapidly from the S-store. Key experiment:

Problems with the Broadbent filter model:

Gray & Wedderburn '60 also used 2 sets of 3 words or syllables, e.g.:

and Ss were able to follow "sense," as shown by the order in which they wrote down the words or syllables.

Similarly, Treisman (1960) (dichotic) found that subjects would sometimes spontaneously follow meaningful text to the other ear. (The task was to SHADOW [speak aloud right after hearing it] the ear that started out with the meaningful message). Both results conflict with filter theory.

MORAY and your name.

Triesman's **attenuation theory**: Attention attenuates ignored channel.

b. Late selection theories of attention

All (or a lot) of the information gets processed to a fairly high level, before selection takes place.

How complete is the processing of an unattended message? Semantic processing of unattended material? More evidence

Lackner & Garrett (1972): Ambiguous sentence attended in one ear.

Corteen & Wood (1972): Experiment in which subjects were first given mild shocks whenever certain words--city names--were presented in a long list. This set up a conditioned autonomic response, the galvanic skin response or GSR, which measures changes in the resistance of the skin with sweating. After training, just seeing the city name increased GSR.

Then Ss SHADOWED prose in one ear and heard a list of words in the other. The list included the city names plus new city names, and neutral words. Measured GSR.

So: Some unattended information seems to be processed at a rather high level.

c. Flexible selection:

The earlier the stage of processing at which selection is possible, the faster and more efficient the response to the attended channel, and the less is processed on the unattended channel.

3. Automatic versus Controlled Attention

Stroop Effect: Name the color of ink that the words are written in. DEMO.

Control conditions:

name colored words, name uncolored words, name colored squares

Why the effect?

Shiffrin & Schneider (1977): the effect of practice on selective attention. (See Reisberg chapter.)

The target set was 1-4 letters, and it was either **consistent**--same throughout the experiment--or **varied** on each trial.

Automatic versus controlled attention.