

Attention

PSYC 313 - Lecture 7
Dr. J. Nicol

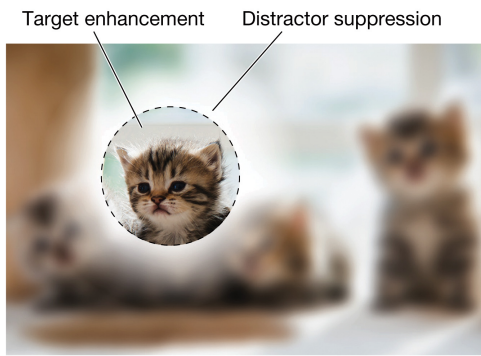
What is Attention?

- Attention refers to a family of cognitive mechanisms that combine to help us select, modulate, and sustain focus on information that might be most relevant for behaviour (Chun et al., 2011)

Selective Attention

- Our information processing is limited, so we can only handle small amounts of information at a time
- Because the information available to us at any given moment exceeds our ability to process it, stimuli compete for our attentional resources
- Attention involves the mechanisms that enable us to recruit resources for processing ***selected aspects of the environment*** more fully than non-selected aspects
- By selectively attending to only some stimuli, we determine how our limited resources are allocated

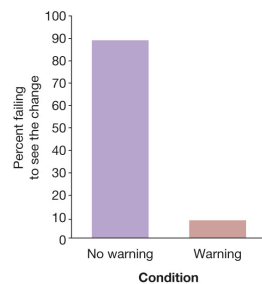
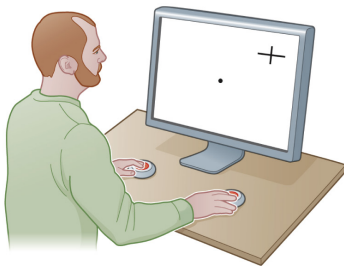
Attention **enhances** processing of selected stimuli and **suppresses** processing of non-selected stimuli



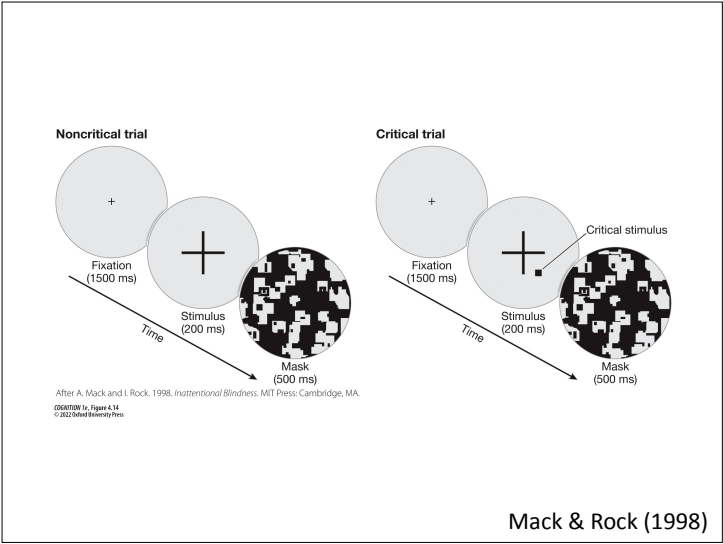
OSGUTHOR 1a, Figure 4.2
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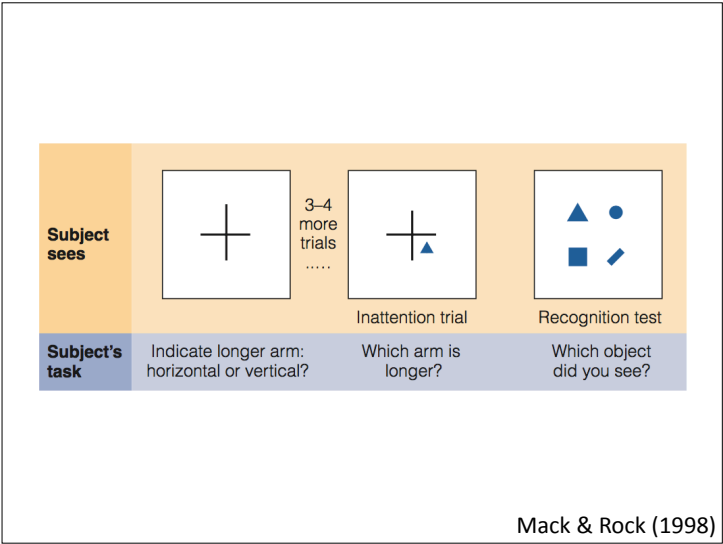
Inattention Blindness

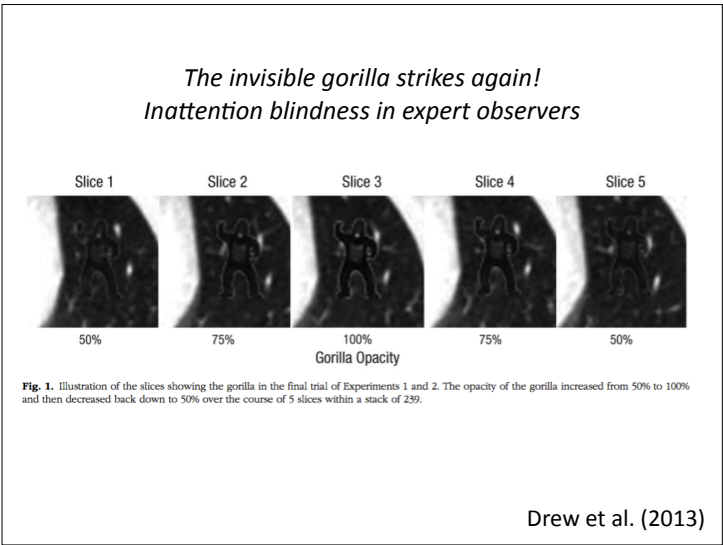
- When we fail to notice an unexpected right in front of their eyes when our attention is preoccupied — it is influenced by our expectations
- Shows that despite what the eyes register, the things that we become actually aware of depend on which aspects of the environment we have selected for enhanced processing

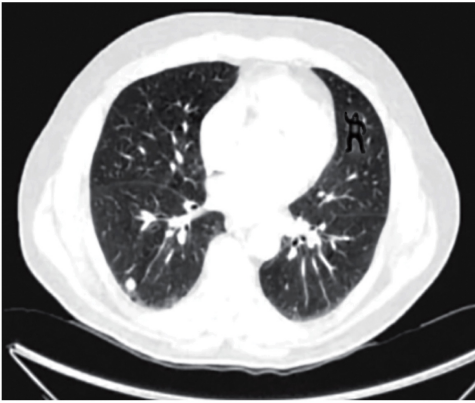


Mack & Rock (1998)



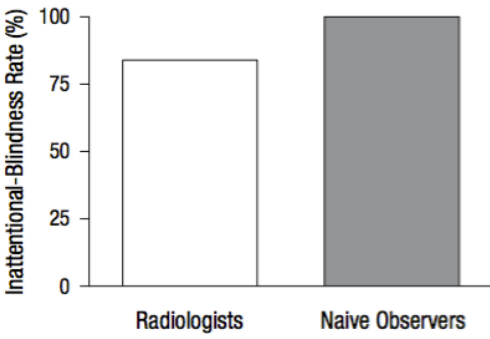




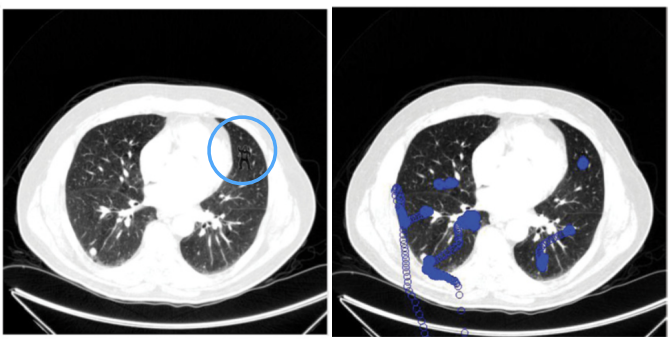


T. Drew et al. 2013, Psychol. Sci. 24, 1848-1853

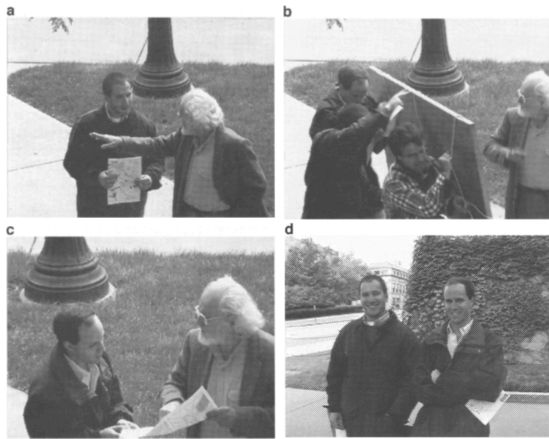
COGNITION: In-Text Art, Ch. 4, p. 98
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Drew et al. (2013)

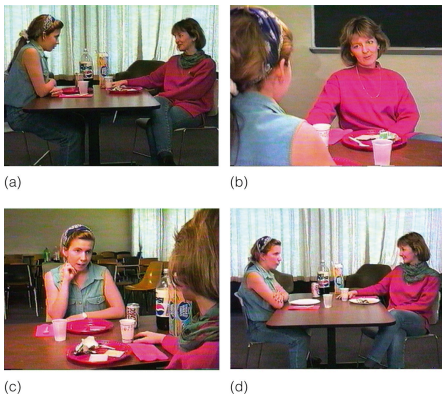


Drew et al. (2013)



Levin & Simons (1998)

Change blindness: the inability to detect changes in scenes that we are looking directly at



Levin & Simons (1997)

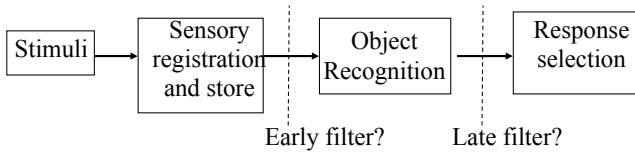
Early vs Late Selection

- It is possible that the participants literally did not see the stimuli, and so the findings may reveal surprising limits on our perception/attention
- It also possible that the participants did see the stimuli but immediately forgot what they just saw, and so the findings may reveal surprising limits on our memory

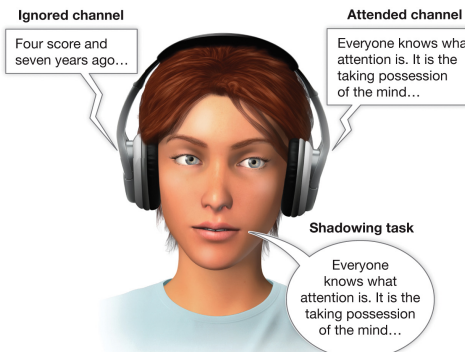
Early vs Late Selection

- **Early-selection theories:** propose that attentional selection occurs prior to the point when stimulus processing reaches object recognition
- **Late-selection theories:** propose that attentional selection occurs after stimulus processing has reached the point of object recognition

Does selective attention filter information before (early selection) or after (late selection) object recognition?



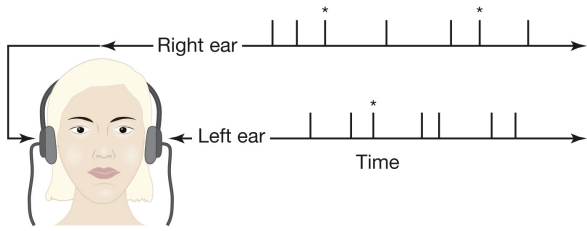
The shadowing procedure in the dichotic listening task



COGNITION 1e, Figure 4.11
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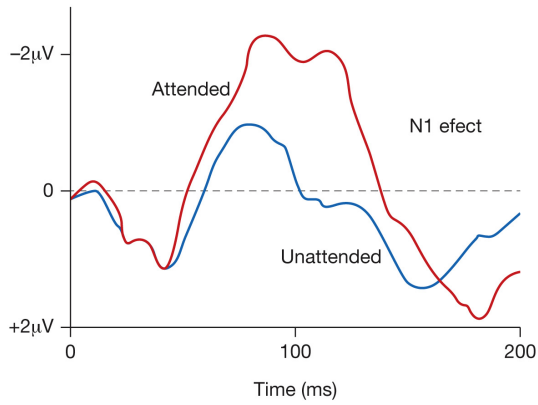
Excerpts from Lincoln's Gettysburg Address, November 19, 1863, and W. James, 1890, *The Principles of Psychology*, Volume 1, Henry Holt and Company, New York.

Participants were instructed to selectively attend to signals in one ear and ignore signals in the other ear



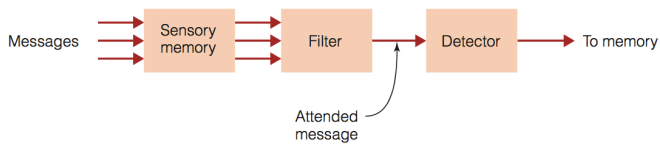
Hillyard et al. (1998)

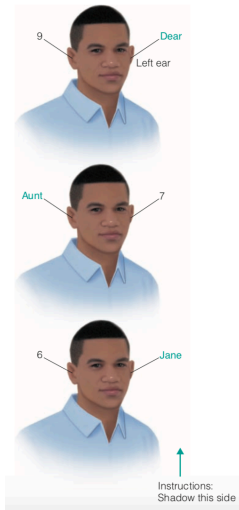
Between auditory channels (early selection)



Hillyard et al. (1998)

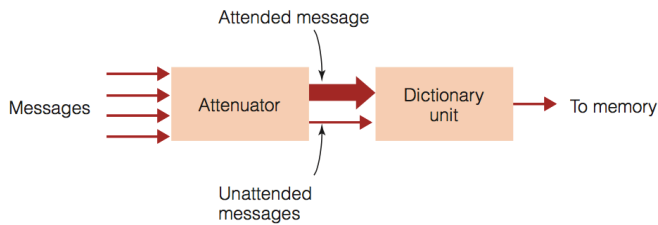
Broadbent's (1958) **filter model** proposes that selective attention acts like an **early-selection filter** that blocks out unattended information such that only the attended message is processed





Gray & Wedderburn (1960)

According to Treisman's (1964) **attenuation model** of selective attention, an attenuator mechanism weakens the unattended message but forwards in a weakened form



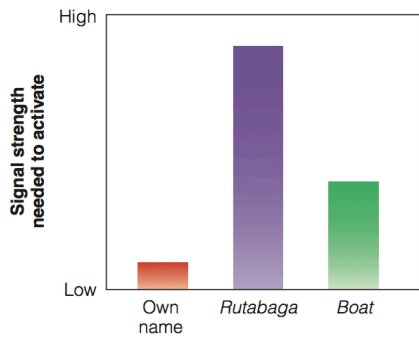
Information of personal significance can be picked up by the perceiver and it can be subsequently processed

Treisman (1964)

Early Selection Theory

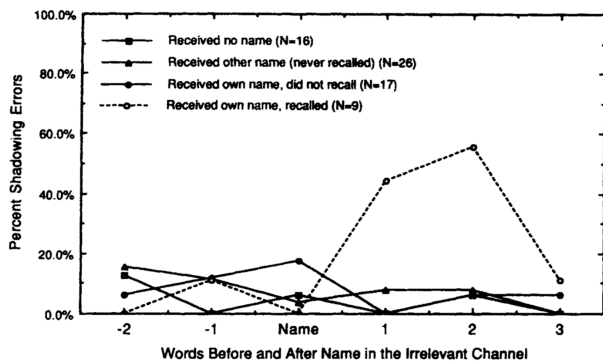
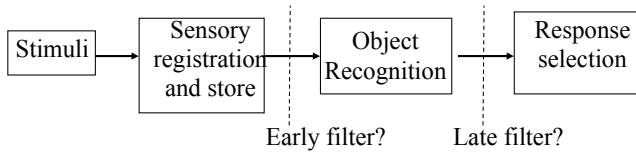
- The attenuator mechanism analyzes the incoming information in all messages in terms of:
 - **Physical characteristics** (e.g., whether it is high-pitched or low-pitched, fast or slow)
 - **Meaning** (e.g., how sequences of words create meaningful phrases)

The **dictionary unit** of the attenuator model contains words, each of which have a threshold for activation



Treisman (1964)

Does selective attention filter information before (early selection) or after (late selection) object recognition?

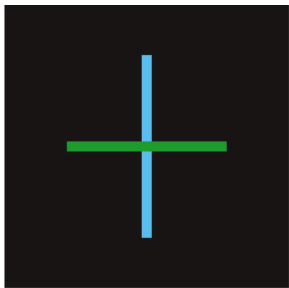


Wood & Cowan (1995)

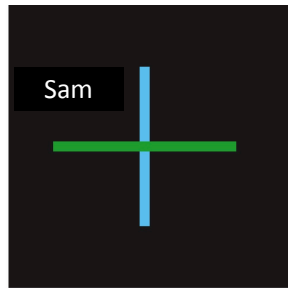
The "cocktail party effect" is a problem for models of early attentional selection



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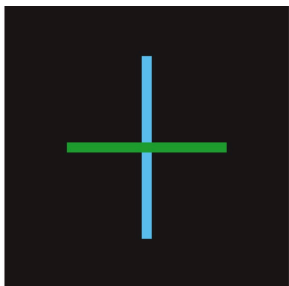


Trials 1 – 5

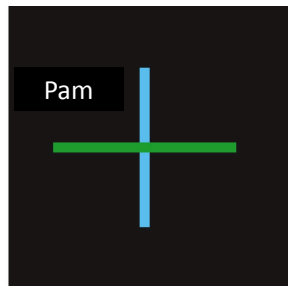


Trial (6)

Mack & Rock (1998)



Trials 1 – 5



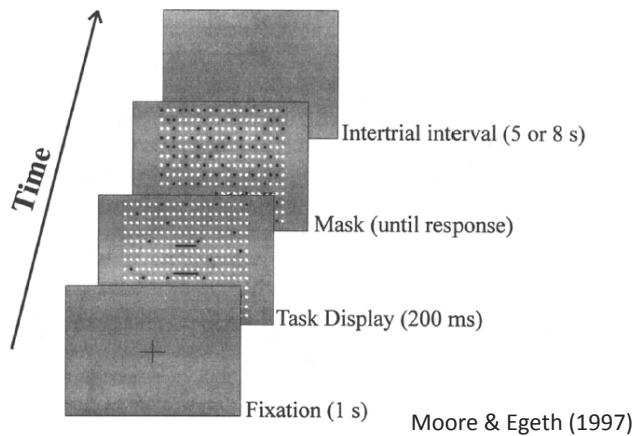
Trial (6)

Mack & Rock (1998)

Late Selection Theory

- **Late selection models** of selective attention propose that most of the incoming information, attended or unattended, is processed to the level of meaning, and then the attended message is selected for further processing (Deutsch & Deutsch, 1963; Norman, 1968)

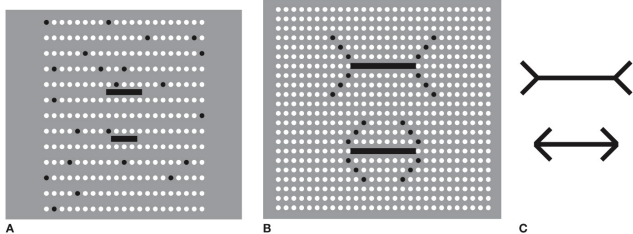
On each trial participants were asked to report which of the two lines was longer



Moore & Egeth (1997)

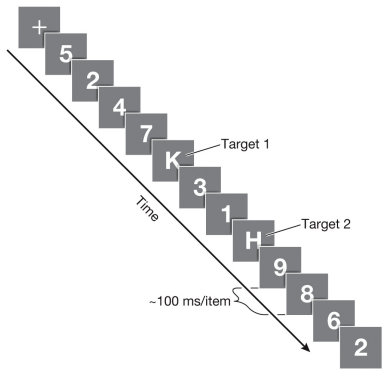
Trials 1-3

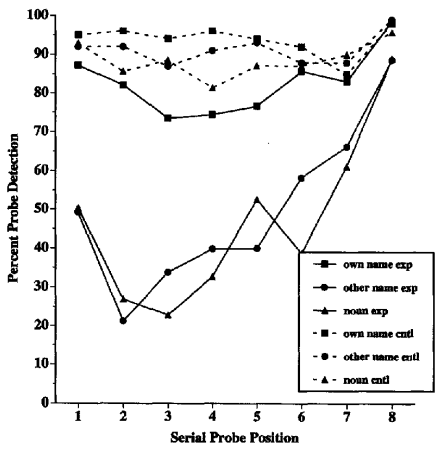
Trial 4



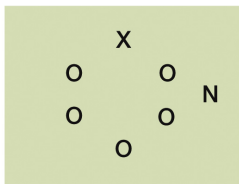
Moore & Egeth (1997)

Detection of Target 1 in the RSVP of distractors often causes observers to fail to perceive Target 2, especially when Target 2 is close to Target 1 — the so-called “**attentional blink**”



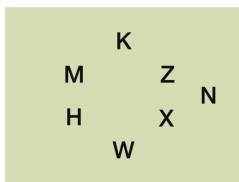


Shapiro et al. (1997)



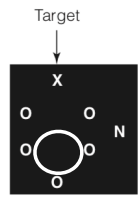
Low Load

Low-load conditions leave attentional resources available which allows them to “spill over” and be affected by distracting information



High Load

High-load conditions consume attentional resources, so they are less to “spill over” and be affected by distracting information



Low-load condition

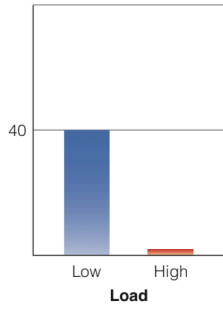
(a)



High-load condition

(b)

Response time compared to compatible flankers (ms)



(c)

Lavie & Cox (2007)
