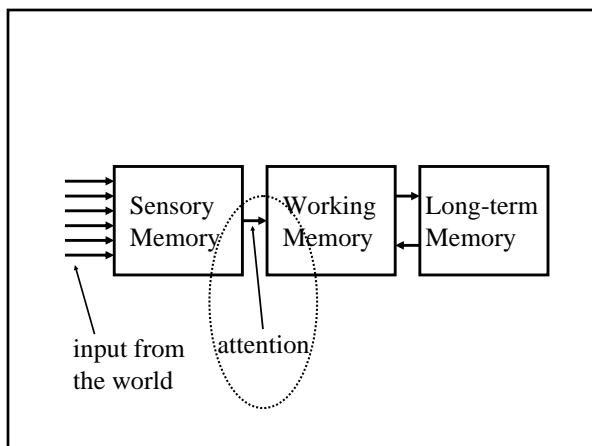


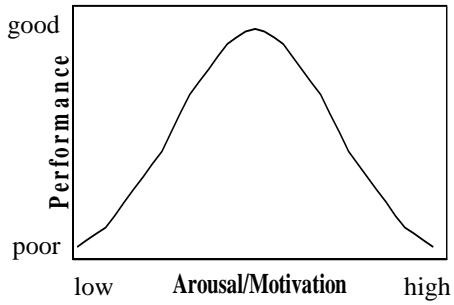
Chapter 4 - Attention

Definition

- Attention: the mental process of concentrating effort on a stimulus or mental event; the limited mental energy or resource that powers the mental system



Yerkes-Dodson Law (1908)



Cognitive Task

- **Cognitive task:** an experimentally constructed situation for studying a particular small set of cognitive skills or activities

Michael Posner

- has done classic studies on attention
- Posner & Snyder (1975) as an illustration of priming
- now a leading researcher in the new field of cognitive neuroscience

Orienting

- Sudden onsets/offsets automatically capture our attention





Inhibition of Return

- we are slower to return to a location where attention has recently been drawn than to move to a new location
- this may have adaptive significance, as when animals do not want to waste time returning to sites where they have already eaten the food
- the concept of inhibition...

Shadowing

Right ear:

If you want to buy a car a bank can lend you the money....

Left ear:

While Bill was walking through the forest a tree fell across his path

If you want to buy a car a bank can lend you the money.....

Cherry (1953)

What could listeners remember about the unattended (nonshadowed) message?

- physical characteristics (e.g., loudness, male or female voice, location)

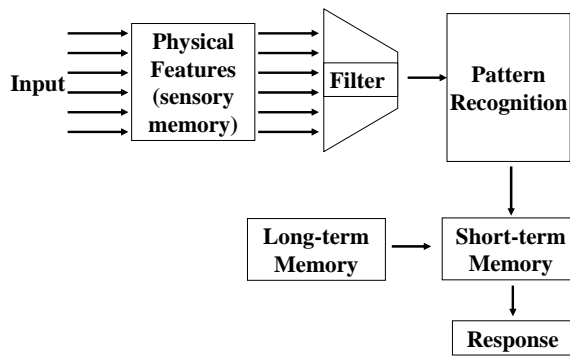
Did not notice:

- meaning of unattended message
- change of language
- speech played backwards
- word presented 35 times

Donald Broadbent (1958)

- one of the first information processing theories
- the filter idea strongly influences theories of attention even today

Broadbent's Filter Model (1958)



Gray & Wedderburn (1960)

	Left Ear	Right Ear
Exp. 1	OB	6
	2	JEC
	TIVE	9
Exp. 2	What	3
	5	the
	hell	4

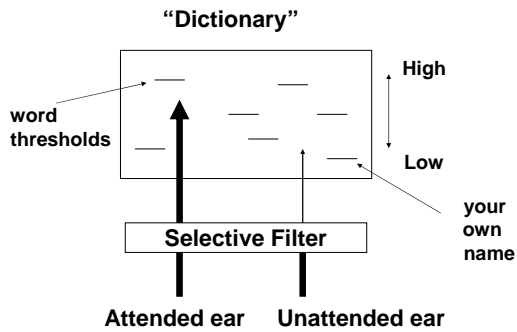
Anne Treisman

- critical experiments on identification, meaning, and attention (1960)
- continues to be one of the most influential attention researchers today

Treisman (1960)

- Attended/shadowed (left):
.... *sitting at a mahogany* **three** *objects*
- Unattended (right):
.... **let us examine these** *table with her*
- *should* shadow the attended channel, but instead says what is in italics. Meaning "pulls" you to the other channel

Attenuated Filter Model(Treisman, 1969)



Deutsch & Deutsch (1963)/ Norman (1968)

- All channels are processed for meaning
- Info that is high in sensory activation & pertinence is selected
- Selected info is what enters into consciousness

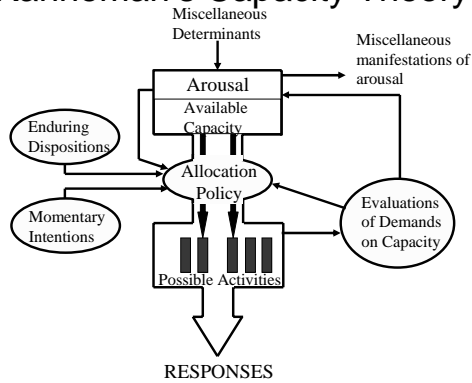
Selective Attention in Reading

You are a man paying attention on to the this corner screen, the reading cat these had words. been However, watching. think He of appeared the so other suddenly inputs and available silently to you'd you, have things thought you he could just pay popped attention out to of if the you ground. chose. The You cat's are tail concentrating twitched on and this its line eyes of narrowed. print.

Daniel Kahneman (1973)

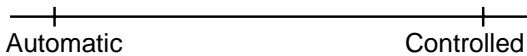
- related arousal and performance, using attentional control
- also a leader in the area of judgment and decision making

Kahneman's Capacity Theory

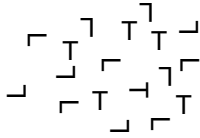


Criteria for Automaticity

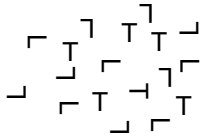
- a process is considered to be automatic if:
 - occurs without intention
 - you are unaware of it
 - does not interfere with other processes
 - it is unaffected by practice
- think of this as a dimension:



Find the Tilted "T"



Find the Tilted "T"

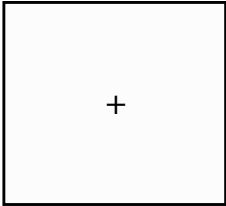


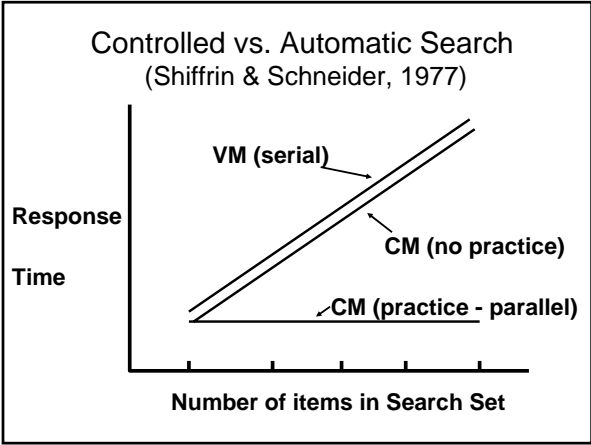
Automaticity in Search

- Richard M. Shiffrin
- Shiffrin & Schneider (1977); Schneider & Shiffrin (1977)
 - extensive series of experiments and a theory about controlled vs automatic search

Walter
Schneider

Is there a "J"?





Instance Theory of Automaticity

- Logan (1988)
- to perform a *controlled* task, we must use an *algorithm* = a slow sequence of processes guaranteed to work
- each time we perform the task, we store a memory representation of the processing act, called an *instance*

The "Horse Race" Model

- Because instances involve memory retrieval without other "computation," they are fast
- In Logan's theory, as more instances are stored, the probability of retrieving one faster than the algorithm increases
- Eventually, every time the algorithm *paces* the instances, it will lose
- Automaticity = that point where an instance always wins the race with the algorithm

The Stroop Conditions

Neutral Congruent Incongruent

The Stroop Effect

- Stroop (1935)
- the incongruent condition (**RED**) is slower than the neutral/control condition (**XXX**); this is called interference
- the congruent condition (**GREEN**) is faster than the neutral/control condition (**XXX**); this is called facilitation
- however, if you read the words and ignore the colours instead, there is no interference or facilitation

Read the Words

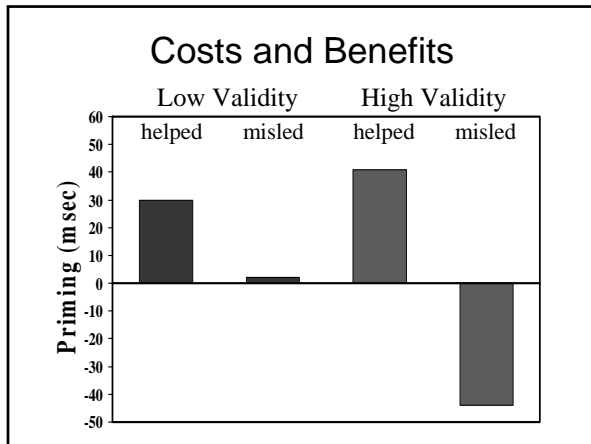
Priming

- **Priming:** a previous encounter with the identical stimulus or a related stimulus (the **prime**) makes subsequent processing of that stimulus (the **target**) easier
- e.g., Zajonc (1980) – the “mere familiarity” effect

Posner & Snyder (1975)

- 3 types of same trials:

	Prime	Target
– neutral:	+	A A
– helped:	H	H H
– misled:	D	F F
- priming could be 80% “helped,” which is called high validity priming, or 80% “misled,” which is called low validity priming



Explaining Costs & Benefits

- benefit 1: stimulus-driven (bottom-up, automatic), due to repetition; fast acting
- benefit 2: conceptually drive (top-down, controlled), due to expectation; slower acting
- cost: due to limited capacity, preparing the wrong detector based on an incorrect expectation “wastes” valuable resources

Multi-Mode Theory of Attention

(Johnston & Heinz, 1978)

- combines selection and capacity views of attention
- subject has control over early vs. late selection by manner in which mental resources are allocated
- early selection requires less resources; do not have to allocate capacity to unattended information
- late selection (attending to more than one task) requires more resources

Disadvantages of Automaticity

- very hard to act against automatic behaviour
- errors
- action slips
