

WEEK 3 BRAIN AND COGNITION- attention

Attention – ability to focus on something, a cognitive process... ‘Everyone knows what attention is’- **WILLIAM JAMES**... ‘the taking possession of the mind, in clear and vivid form of one out of what seem several simultaneously possible objects or trains of thought. Focalisation, concentration of consciousness are of its essence’. **IT ENABLES US TO FOCUS ON ONE PARTICULAR STIMULUS WITHOUT HAVING TO WASTE PRESCIOUS BRAIN RESOURCES ON IRRELEVANT STIMULI**

Research on attention started in the 1950s (late)- it is strictly related with **perception**. Most research focuses on visual attention and emphasis is given to external attention. This topic is very subjective and is difficult to assess in a laboratory.

FORMS OF ATTENTION-

ACTIVE vs. PASSIVE

- Active: Attention is controlled actively by the individual's intentions, goals or expectations (top-down)
- Passive: Attention is controlled by external stimuli (bottom-up)

FOCUSED vs. DIVIDED

- Focused (or selective attention): Attention is directed to one specific stimulus or task among many other distracting (irrelevant) stimuli
- Divided: Attention is directed to more than one stimulus or task at time

EXTERNAL vs. INTERNAL

- External: Attention directed to the selection of sensory information (outside from the mind)
- Internal: Attention is directed to internally generated information (thoughts, responses, memory)

OVERT vs. COVERT (only for visual attention)

- Overt: eyes are directed to the object/space that is under focus of attention
- Covert: eyes are directed elsewhere to the focus of attention

THE LINK BETWEEN PERCEPTION AND ATTENTION-

Attention plays a key role in determining which aspects of the environment are consciously detected- however some information may cause other info to go completely unnoticed, even if it is right in front of our eyes.

Change blindness- inability to perceive change between 2 scenes that are presented in succession for a short time- **RENSINK** (1997)- spot a difference between 2 screens with a brief blank screen in between.

Inattentional blindness- inability to spot obvious events happening whilst we are focusing attentional resources on a given test- CHABRIS (1999)- following the ball then gorilla comes

Magic- magic tricks are a good illustration of how limited and selective our attention is- they exploit change blindness and inattentional blindness- they deceive and misdirect our attention. E.g.

KUHN+TATLER (2005) cigarette and lighter trick (in the book) only 2 out of 10 noticed and still only 4 when repeated.

OVERT VS COVERT ATTENTION-

POSNER'S cueing task – cueing paradigm

KEY QUESTIONS-

How do people choose which stimuli to attend from the environment and which to ignore?

Early selection- stimuli selected based on specific characteristics

Late selection- relevant info selected based on its meaning

Perceptual model- attention= limited capacity and selection is based on task demands

At what level information is processed when we decide to pay attention to a stimulus?

Early selection- apply a filter on upcoming info at a low perceptual level

Late selection- Filter placed at a higher pre-conscious level

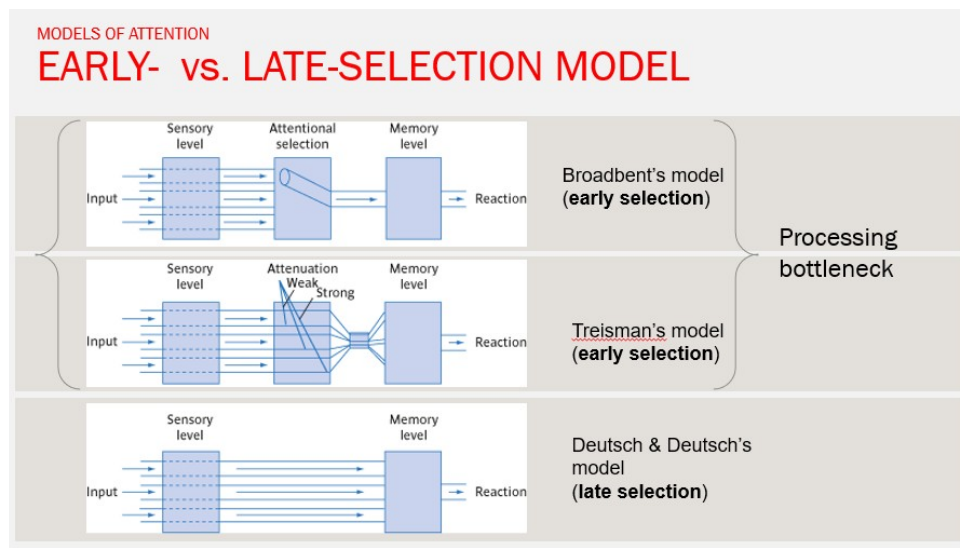
Perceptual model- applied at either very early or late stage

What happens to the stimuli that are unattended?

Early selection- irrelevant stimuli remain a 'temp. buffer' for a short time- then they are discarded

Late selection- irrelevant stimuli can influence behaviour of attended stimuli (without awareness)

Perceptual model- may influence behaviour/processing of attended stimuli



COLIN CHEERY (1953)- the cocktail party phenomenon. How do we pick up sounds around us that are only relevant? And what is the difference in processing for attended vs unattended sounds.

SOUND SEGREGATION- a mixture of sounds reaches the ear, and the listener has to decide which sound to attend

SOUND SOURCE OF INTEREST- Once the sound is detected attention must be directed and kept towards its source > effortful

CHERRY found if irrelevant message was identical to attended message but lagging of- 6-2secs they couldn't notice the similarity

BROADBENT observed that if the two messages were very short participants could remember the message from unattended ear

This, suggesting that there may be a sensory buffer- a short-lived sensory store that could hold on to unattended material for a few seconds prior to selective filtering leading to research into rejected messages e.g. **TREISMAN'S** attenuator model (1964)

- Broadbent's Filter model suggests the filter operates in all-or-nothing fashion
- Treisman's Attenuator models suggests a more graduating, leaky filter that allows unattended stimuli to pass selection, if they contain some relevant meaning (e.g. familiarity, semantic or contextual relevance)
- In both cases the information that doesn't pass the filtering is left to decay in the sensory buffer (at a very initial stage of processing).
- Therefore, these models suggest that unattended/rejected information has no effect on behaviour....

PROBLEMS-

TREISMANS model doesn't explain how exactly semantic analysis works. How does the model deal with the fact that we are sometimes aware of the messages that are unattended? What is the nature of the attenuating process?? And which particular stimuli should be processed beyond physical properties?

LATE SELECTION MODELS

So... **DEUTSCH+DEUTSCH'S** model = all stimuli are full analysed!! They are assigned to corresponding representations based on previously stored knowledge. The problem was that we couldn't find an experimental paradigm to test the predictions- we couldn't prove. Late selection models predict that unattended stimuli should have an effect on behaviour- this prediction has been tested using subliminal priming paradigm.

Subliminal persuasion- **JAMES VICARY** claimed one could unconsciously influence people to buy products (e.g. Short messages of coca cola = 57% sale increase) BUT there is no empirical evidence.

Subliminal priming- is more likely to affect behaviour on short term. E.g. **DEHAENE** (1998) subliminal prime= written number, white short duration and masked. Target= number either larger or smaller than 5. Congruent condition= prime and target and both \neq 5. Incongruent condition= prime and target belong to opposite categories

Negative priming- **TIPPER** – slower reaction times when ignored objects in prime trials becomes the attended object in probe trials

EARLY VS LATE SELECTION MODEL

Dichotic Listening Task	Priming Task
<ul style="list-style-type: none">• Supports early-selection model: shadowed information is filtered at sensory level.• BUT: The shadowing represents pre-selection of appropriate action leaving out possibility for unattended information to affect behaviour	<ul style="list-style-type: none">• Supports late-selection model: no explicit requirement to attend the prime• BUT: No appropriate control over what stimuli the participant should attend at sensory level..... the possibility that subliminal stimuli are filtered at sensory level could still applies.

PERCEPTUAL LOAD MODEL – LAVIE

This model doesn't see attention as a filter, but as a system with limited resources capacity

The resources are required by the demands of the task at hand:

- If task is demanding, lots of resources are required to narrow the focus on it.
Fewer resources will be left for other stimuli.

Vice versa, an easy task does not demand much resources which can instead be dedicated to other purposes

Early selection= easy task, low load late selection= demanding task, high load

This LOAD MODEL is most accepted as it provides a more flexible framework than previous early and late selection models- it focuses on understanding why this selection occurs and in what way. This model says *attention is a fluid system* that takes several factors into consideration.

AUTOMATICITY- certain actions get practiced so many times that they don't require extensive effort/attention- e.g. driving, typing

JOHN RIDLEY STROOP- Stroop effect (1935) the meaning of the word automatically comes to mind as reading is a highly practised task.

SHIFFIN AND SCHNIDER (1977)- ptps had to remember up to 4 letters/digits (memory set), then were presented with a new set up of digits/letters (display set)- the task was to indicate whether any symbols in display set corresponds to the memory set.

NORMAN AND SHALLICE (1986)- say we have schemas