



IHS – L4

Introduction to Human Sciences

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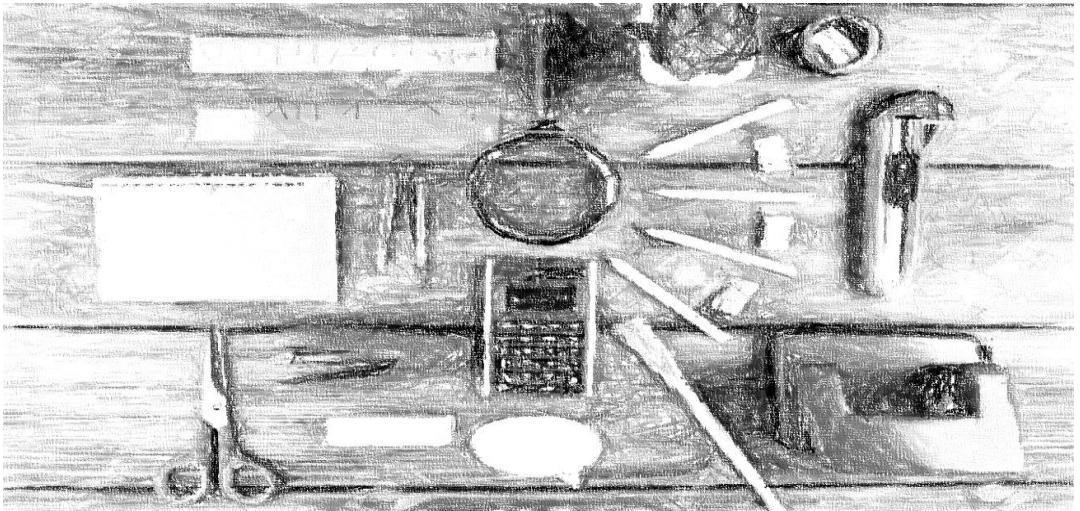
Activity Class -Reflection

Activity Reflection Experience BLIND !

Visual Deprivation

Role of vision and other sensory modalities in understanding space





Task 1: Peri personal Space activity – search an object from 3 different position at a hand reachable space, for instance table, with and without blindfold.



Task 2: Small – medium Scale Locomotion and Distance Estimation – Close your eyes and try to walk around and see how you figure out the obstacles around, estimate distance, and most importantly, the sense of balance.



Task 3: Fill the MUG - Use water at room temperature for this task. As name goes by, your task is to fill the mug with water and record the total time taken to fill the mug and ability to estimate the judgement of completion.

3 tasks – sense of space –spatial attributes and spatial abilities in relation to the sensory modality

- Peri-personal spatial task – table top object localization task
- Small or Medium Scale environment, locomotion and target localization task –

The scale of the environment is determined by the action with which you interact with the environment. Eg. When an environment requires just an eye-movement or head-movement to explore the environment , like table top or map reading, it is referred as a small scale environment. The small scale environment requires minimal action to explore the environment to acquire spatial information, the objects, their position in space, as well as the spatial relation between objects. The medium and large scale environment requires locomotive, self-motion based action to explore the environment in order to acquire spatial information or reach out for the target objects. The medium scale environment would require comparatively lesser locomotive action to acquire spatial information. In other words, the spatial relation between objects, and position of the objects, could not be acquired in larger scale without significant locomotion, such learning about different object of interests in IIIT-H spatial layout. Whereas, learning about different object of interest in a room or on a floor of given building could be medium scale environment, in which the spatial attributes could be learned with some locomotive information along with eye-and head-movements.
- Mug filling –depth estimation task

Two psychological processes – Spatial awareness/ spatial attention and perception, and Spatial memory

- **Spatial awareness Task** – distance estimation and depth perception task , performed with the available cues and feedbacks
 - In case of sighted / visual/ eye-open task, the visual cues/ feedbacks were used to perform the task
 - In case of eye-closed condition, the immediate and natural source of cues/ feedbacks were lost. Which made the task difficult and at the same time interesting.
 - This forced us to develop or realise the other cues using alternative modalities, like auditory/ touch/smell etc. and used these cues as feedback to help us perform the task.
- **Spatial Memory Task** – Recall of spatial position of the given target object from your memory
 - Locomotion and distance estimation could be performed using memory of the whereabouts/ locations of the object of interest in the environment.

REFLECTION: What was happening at psychological level, when I was performing the task with eye-open and eye-closed condition. The reflection was made to realise that Psychology could be more than Watson, or Skinner's Psychology of Learning (the most popular known Psychologists in history of psychology).

- Absence of visual cue impaired the task performance because of the lack of visual feedback while performing the given task. Such as, dis-orientation, loss of sense of balance, over or under estimation, collision, or falling down. *This will be covered again in perception and attention class.*
- Had these tasks been performed with some alternative external cues, like someone making sound from the expected location, the performance could have been different.
- Realized and developed alternative cues that could help the given task with eye-closed condition. For instance, clock ticking count , foot tapping count, pouring water from different height to use as cue, weight, smell etc.
- Initially it was difficult but eventually I could devise a method to deal with it.

REFLECTION on Method:

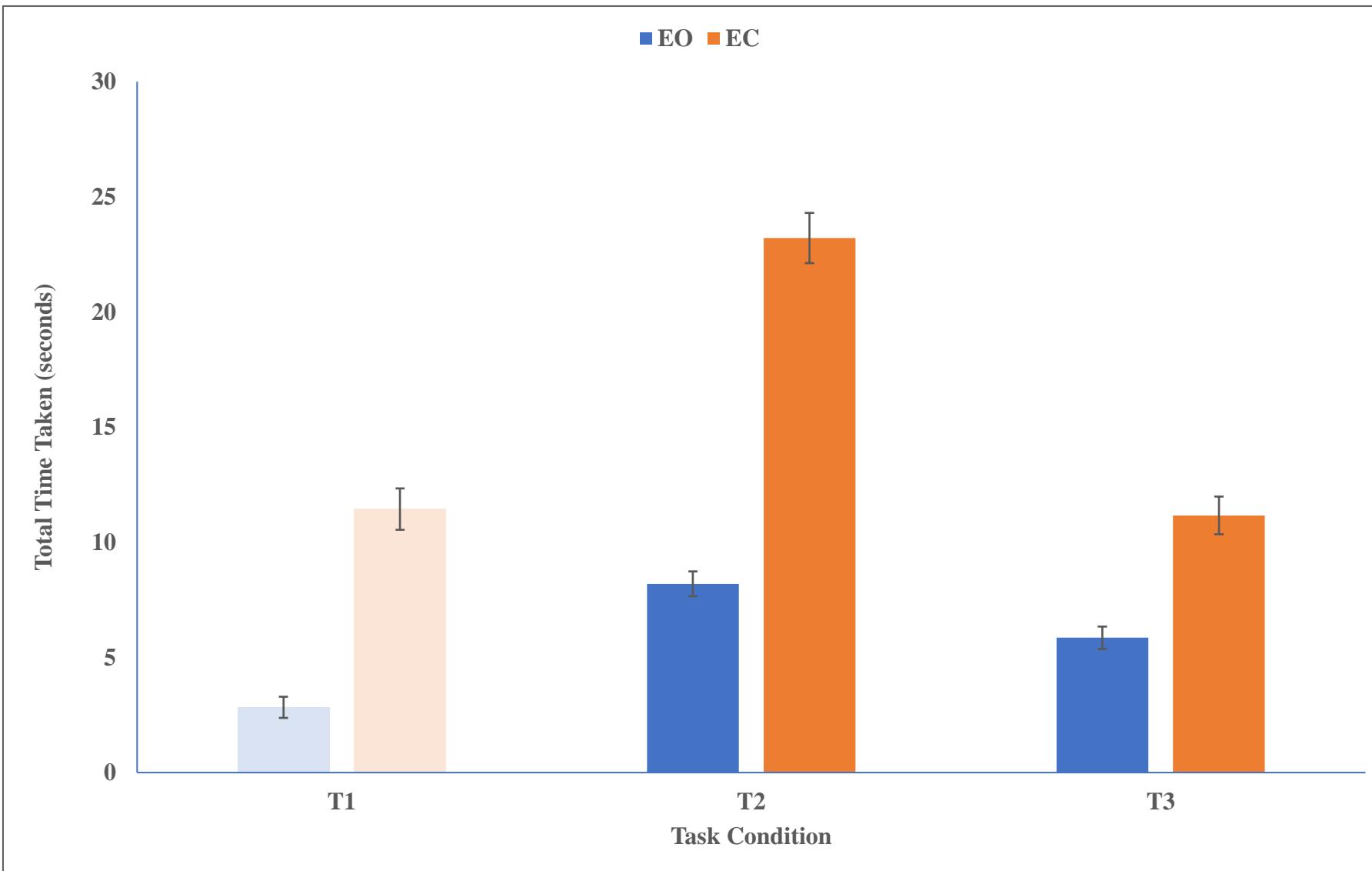
- **Condition:** Why did we choose the eye-open and eye-closed condition, and why did we choose a certain number of trials?
- **Participant and Task Variability:** What is individual variability and Ecological validity?
- **Task :**
 - Type/ kind of tasks,
 - Operationalization - how it enabled to operationalize the psychological construct,
 - Number of trials - how many trials will be good enough, how we can minimize the random variables,
 - Random and systematic variables - how we can minimize the systematic variables, why considering these variables will be important for any research,
 - Field versus lab experiment – associated random variabilities.

Prafullitt – Should the experiments be performed in a controlled environment? Its important to understand what does controlled refers to?

Controlled could be – enabling all the participants to come to the same room consistent with similar lighting, area coverage, similar type and amount of obstacles, or controlled could be exercising alternative cues and evaluating whether those cues can be considered as feedback or not?

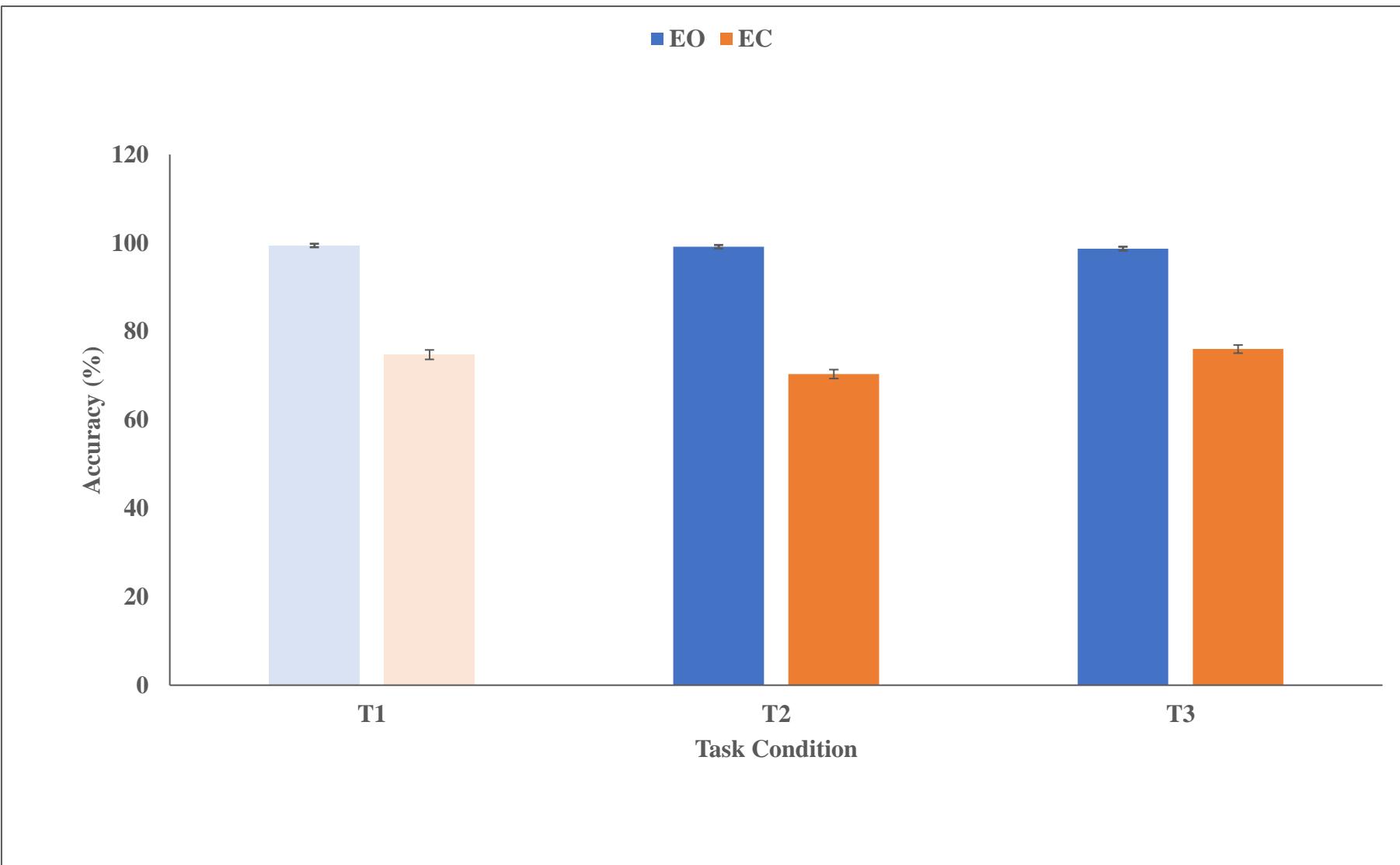
Mukund- Why did we do it 5 times with Eye Open? Eyes Closed is understandable, but at least for me the 5 times EO was all the same timings.

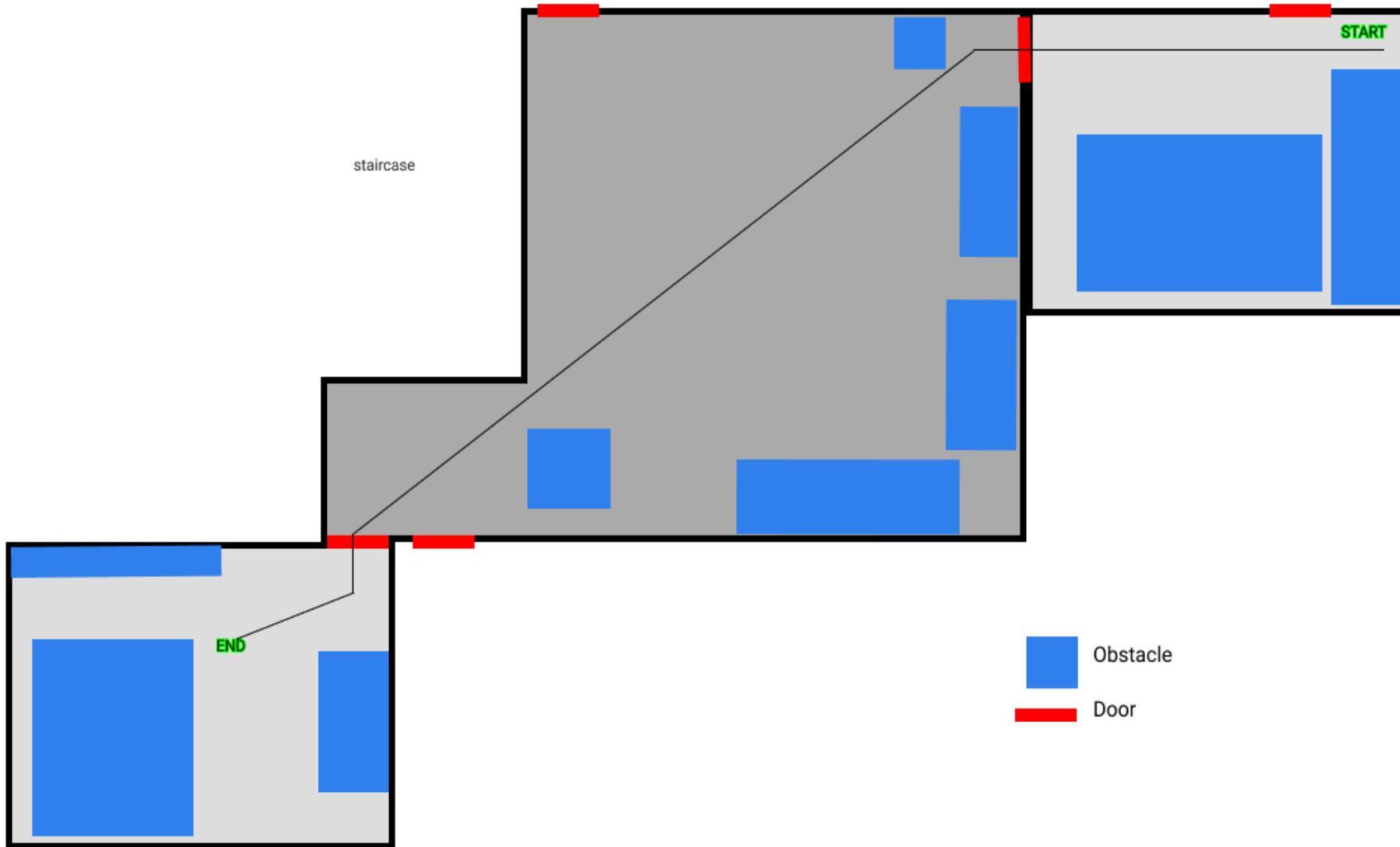
	T1	T2	T3
EO		2.83	8.19
EC		11.44	23.21
EO-StdEr		0.46	0.54
EC-StdEr		0.90	1.09
			5.85
			11.17
			0.49
			0.81



	T1	T2	T3
EO	99.43	99.14	98.69
EC	74.71	70.34	76.00
EO-StdEr	0.39	0.41	0.45
EC-StdEr	1.07	1.02	0.93

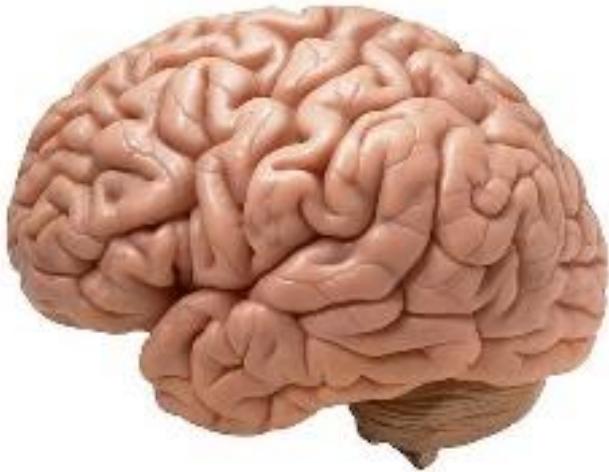
The results need revision
with correction of unit of
measurements.





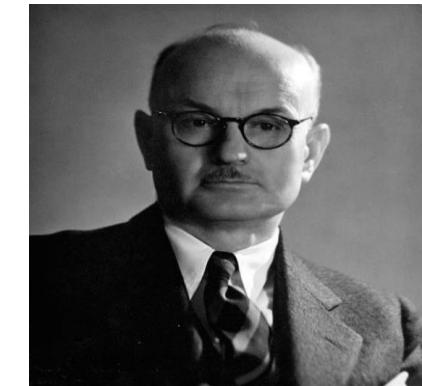
Created by - Arathy Rose Tony

How we study the interaction between stimulus and response ?



Behaviorist

vs. Cognitivist Approach



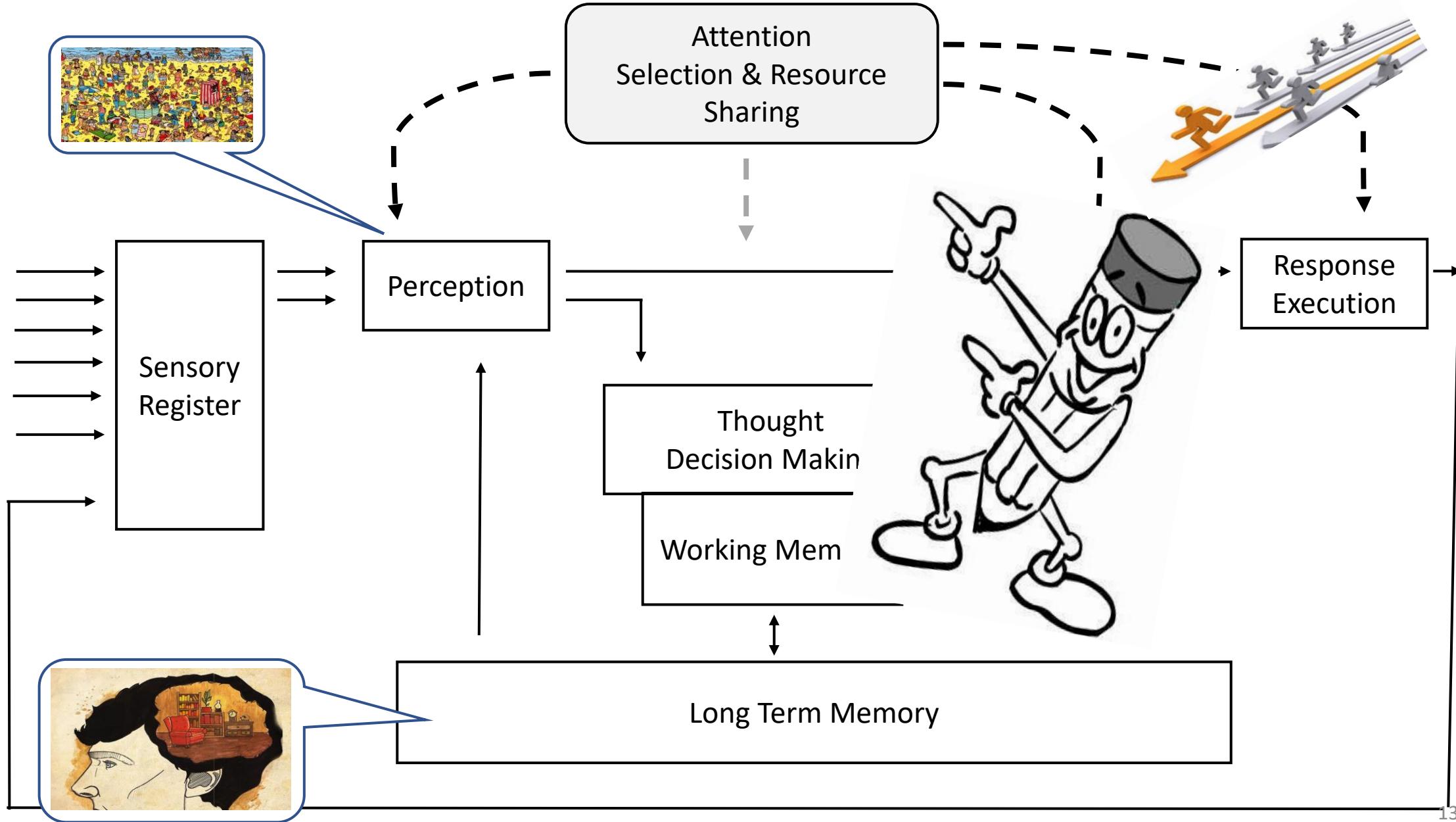
Information Processing

Mental Representation

Computation

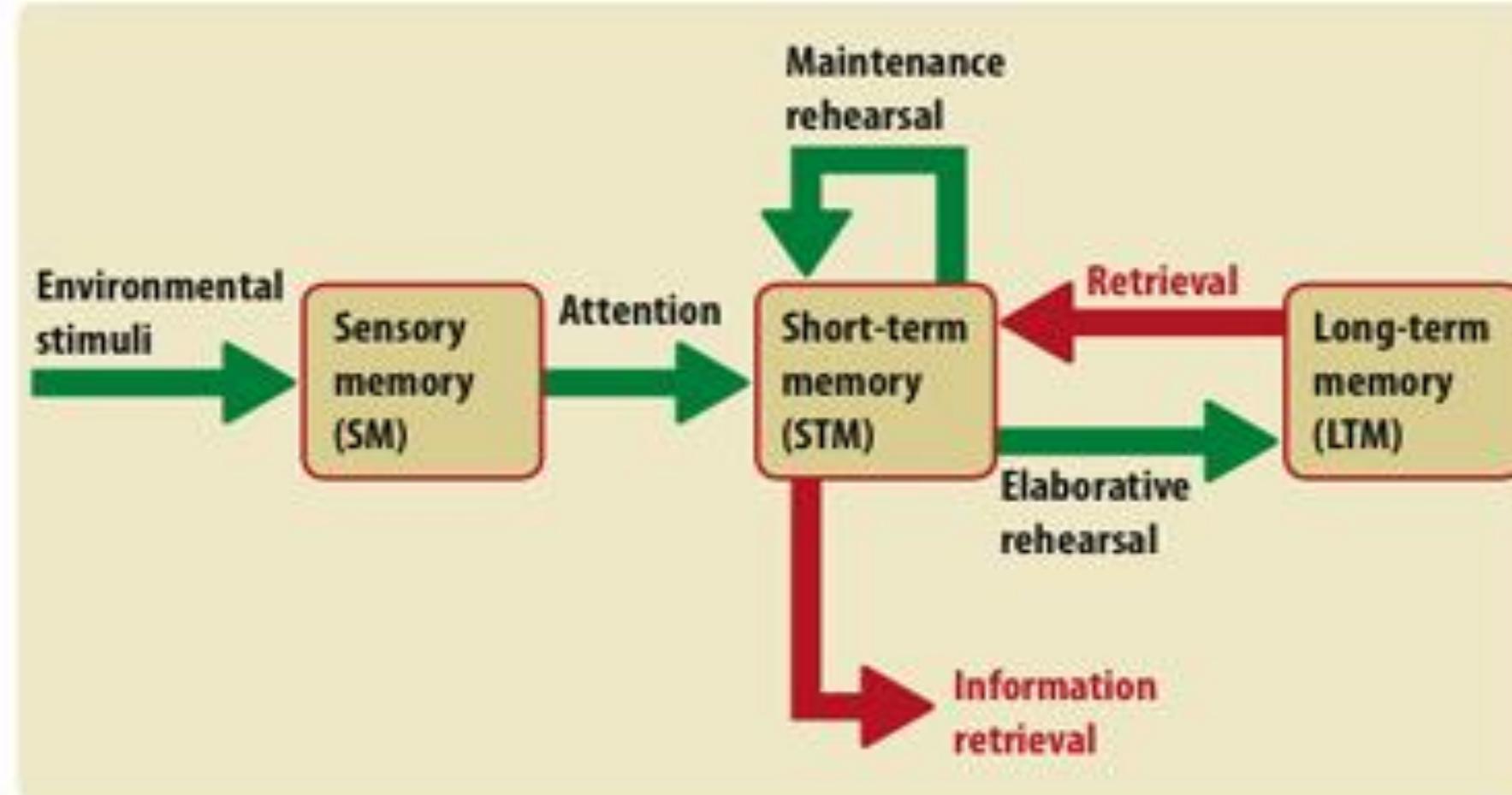


Information Processing Model – S-O-R



Why attention is important ?

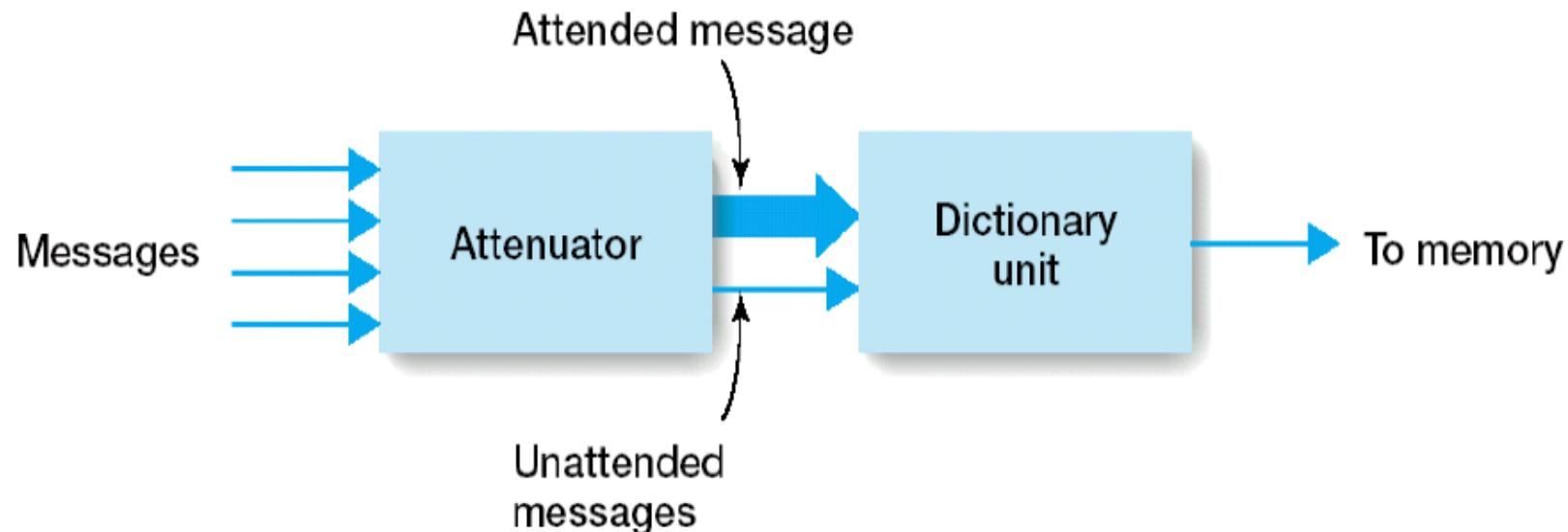
Influence Memory



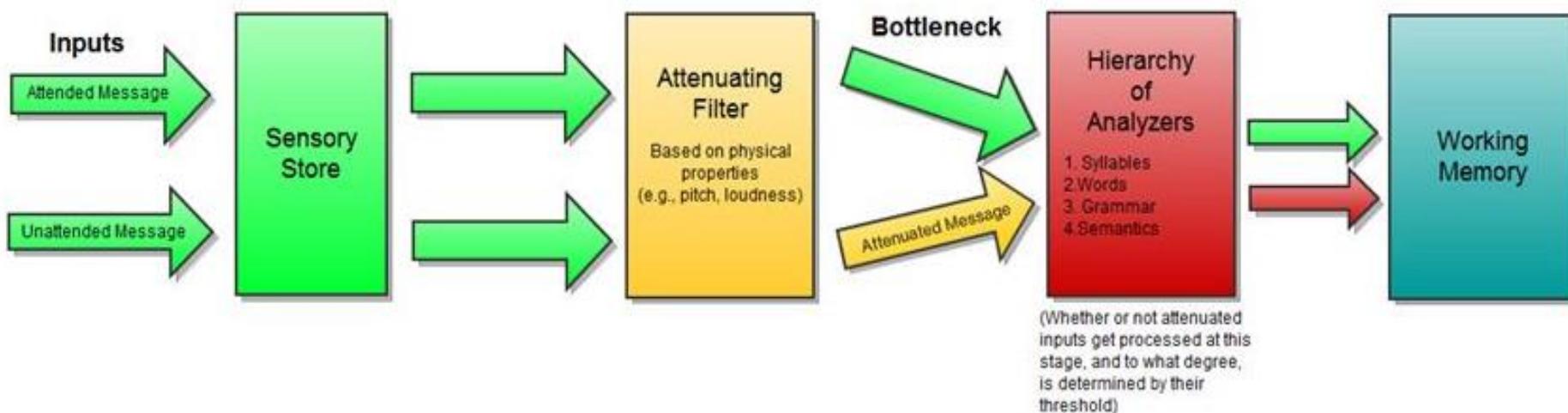
Atkinson and Shiffrin, 1968

Loci of Attention - Triesman's Attenuation model of selection

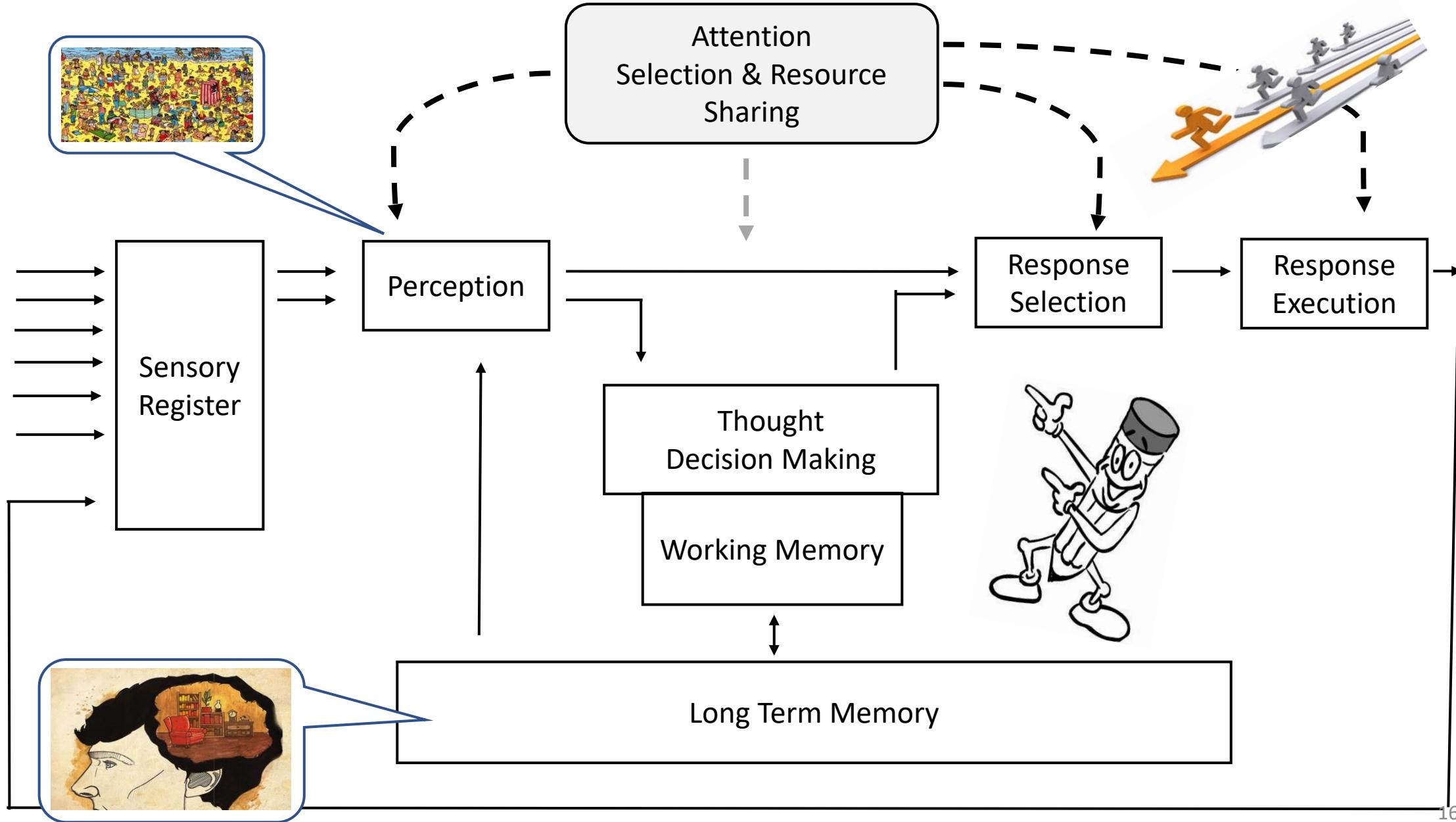
Cocktail party phenomenon

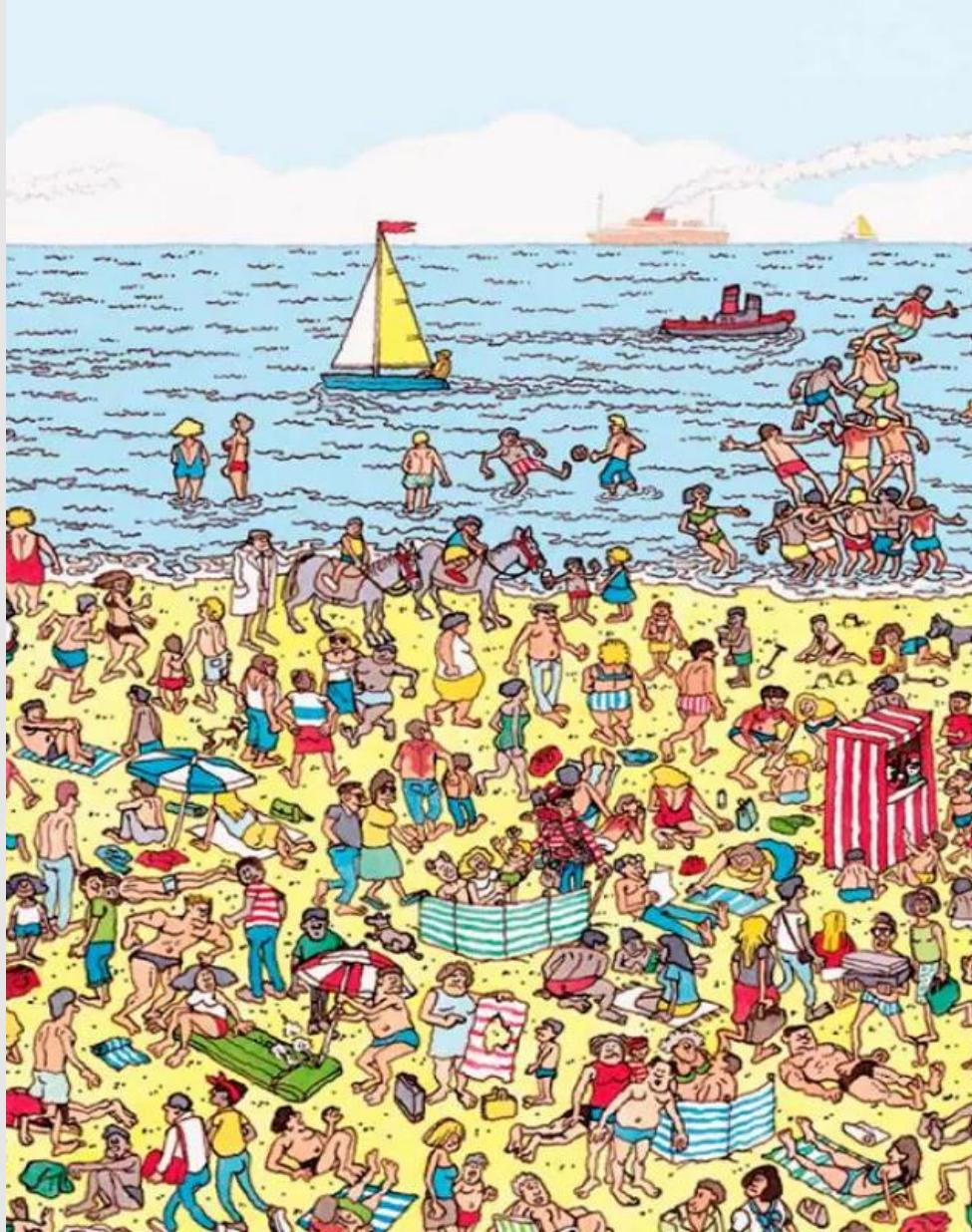


Triesman's Attenuation Model



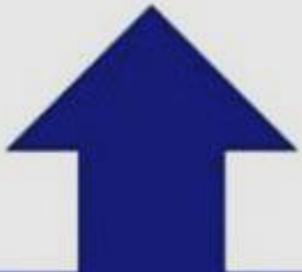
Information Processing Model – S-O-R



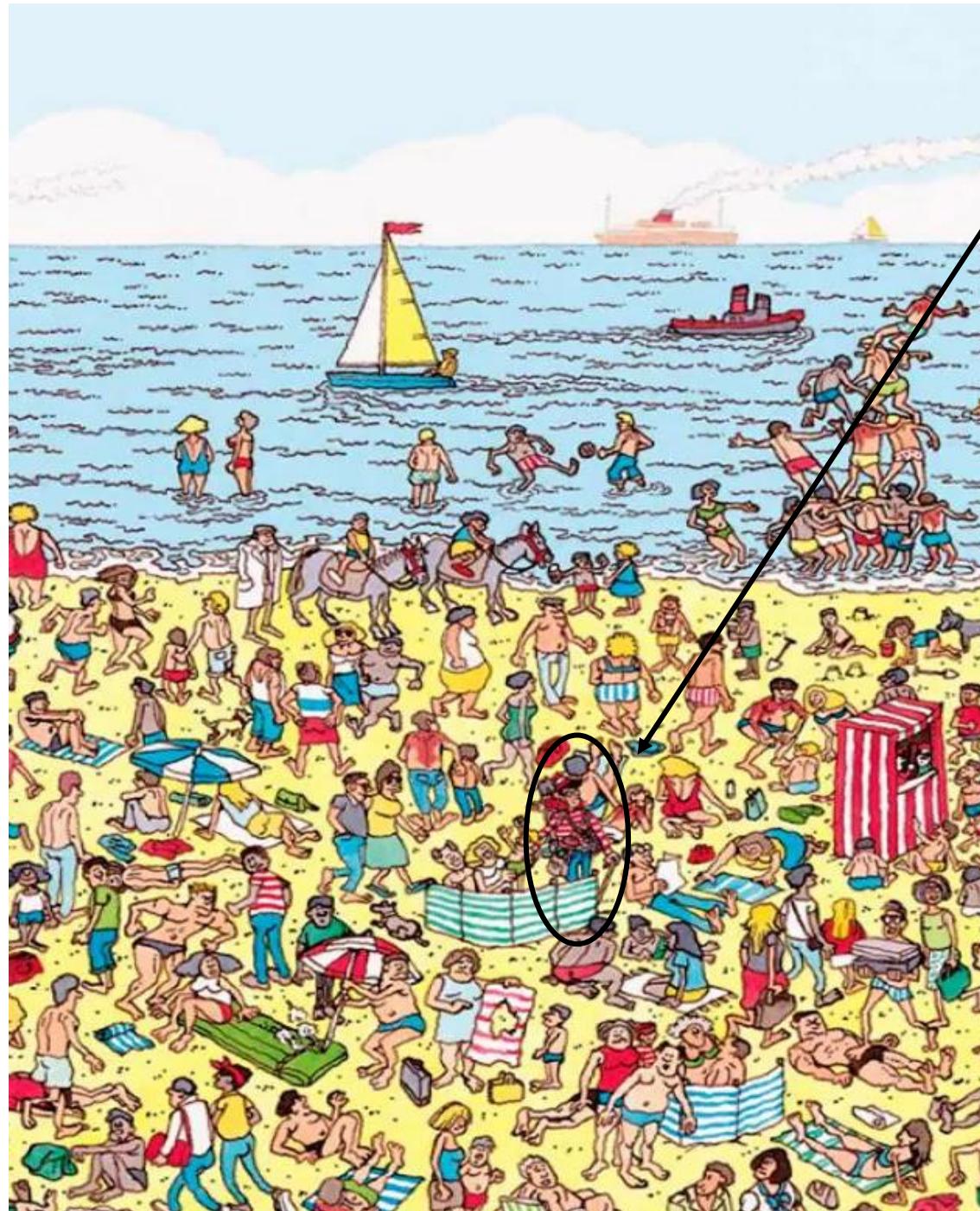


Wally or Waldo – Where's Wally, Children puzzle book, by Martin Hanford, 1987

What am I
seeing?



Bottom-up processing:
taking sensory
information and
then assembling
and integrating it

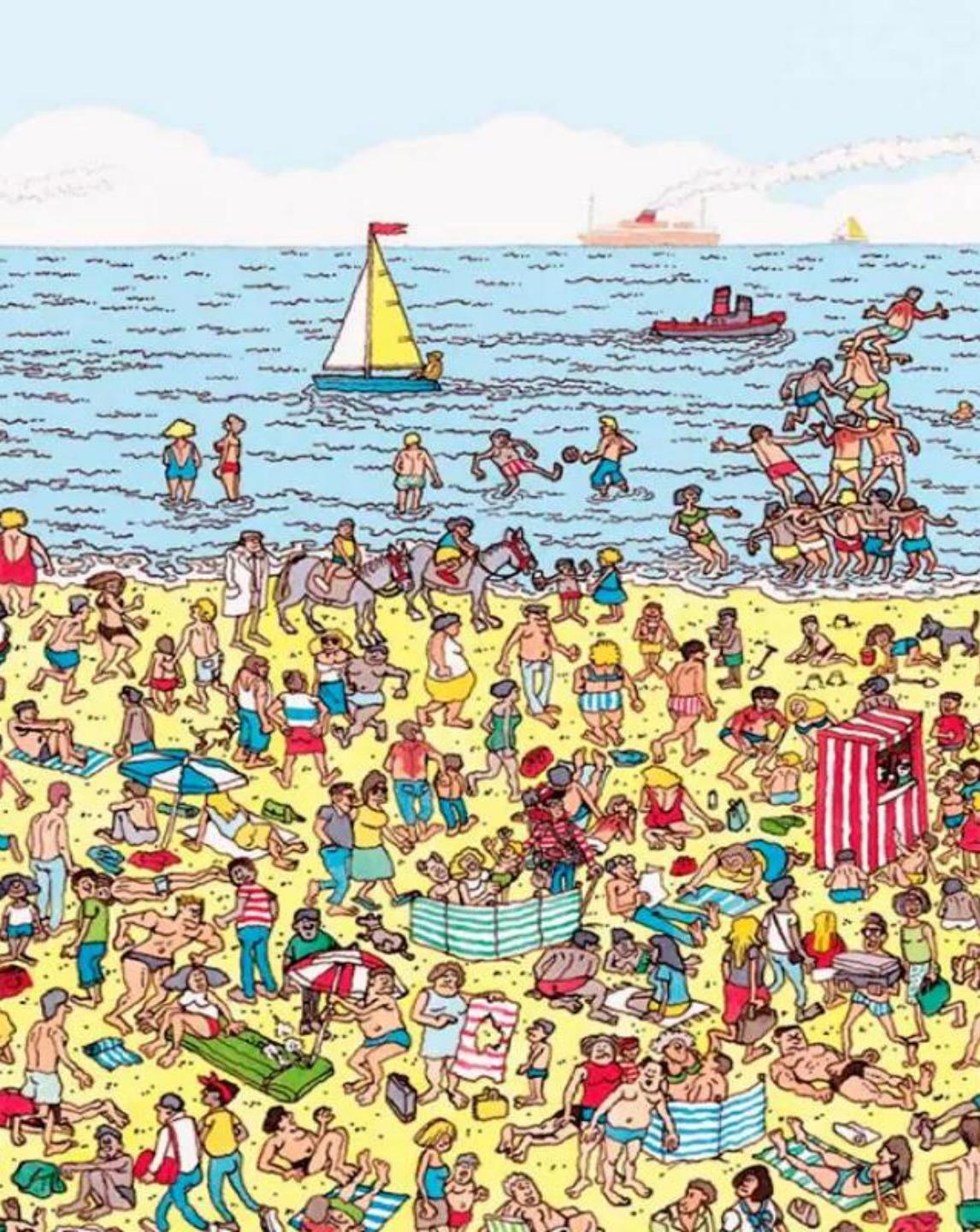


**Top-down
processing:**

using
models, ideas, and
expectations to
interpret sensory
information



Is that
something I've
seen before?



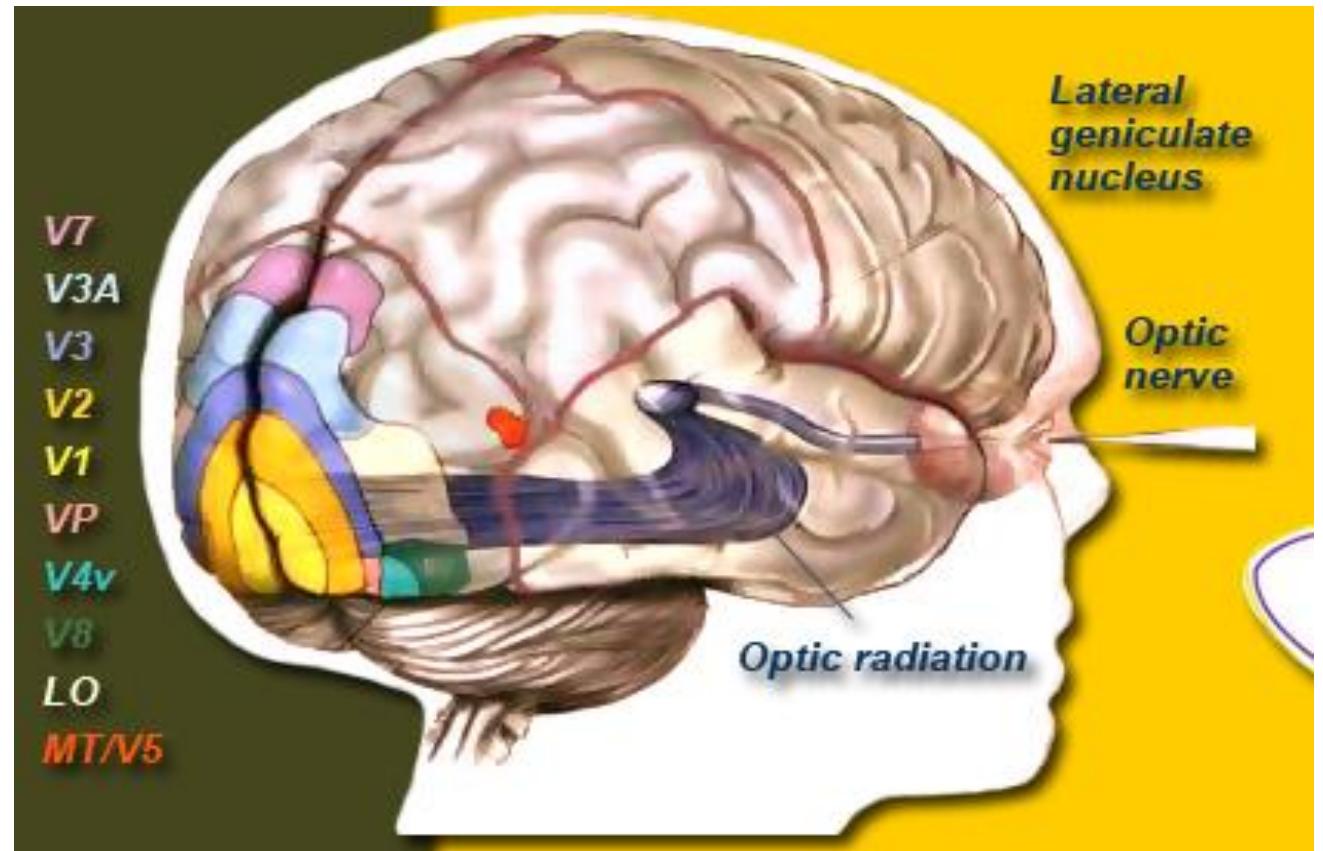
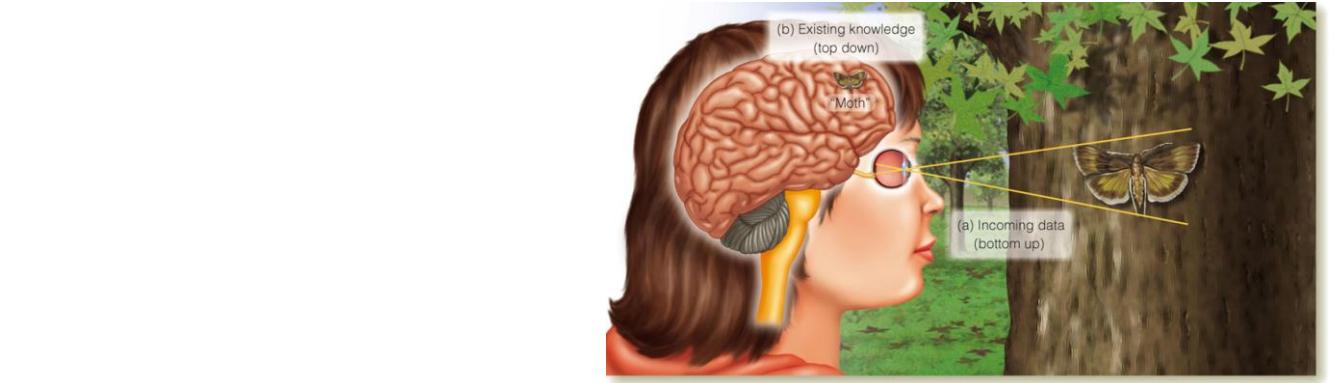
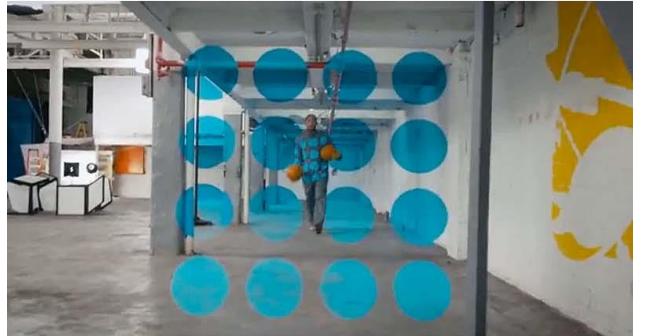
- Perception is an organization, identification, and interpretation of the sensory input
- Retinotopic mapping – from eye-to-brain
- Gestalt approach – the whole is more than sum of its part
 - Perceptual organization – similarity, proximity, continuity, and closure
 - Figure-ground segregation
- Different models to form the object

THE WRITING'S ON THE WALL

vevo



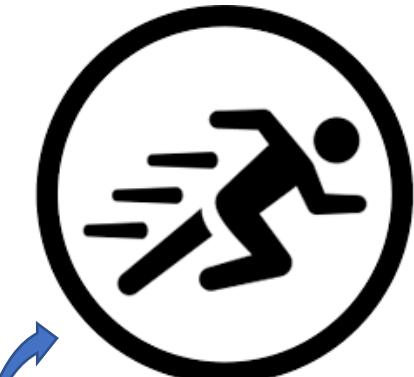
https://www.youtube.com/watch?v=oL3qDpubXU8&ab_channel=OKGoVEVO



STAGES OF PERCEPTION-ACTION



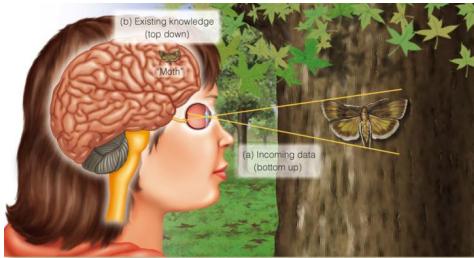
Culture,
knowledge, and
Age/ development



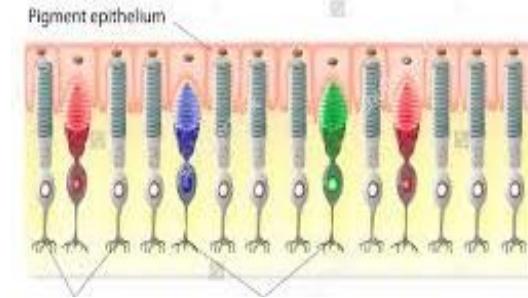
Action



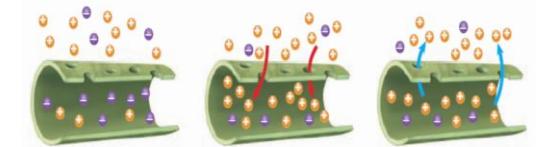
Perception



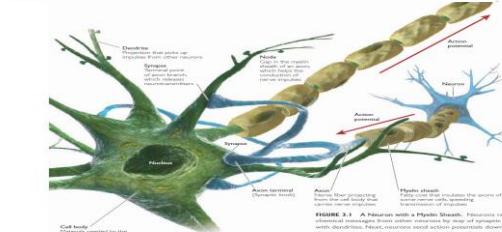
Stimulus



Transduction

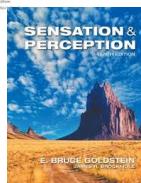


At rest.
During an action potential, positive particles rapidly flow into the axon.
When the inside of the axon accumulates maximal levels of positive charge, positive particles begin to flow back out of the axon.

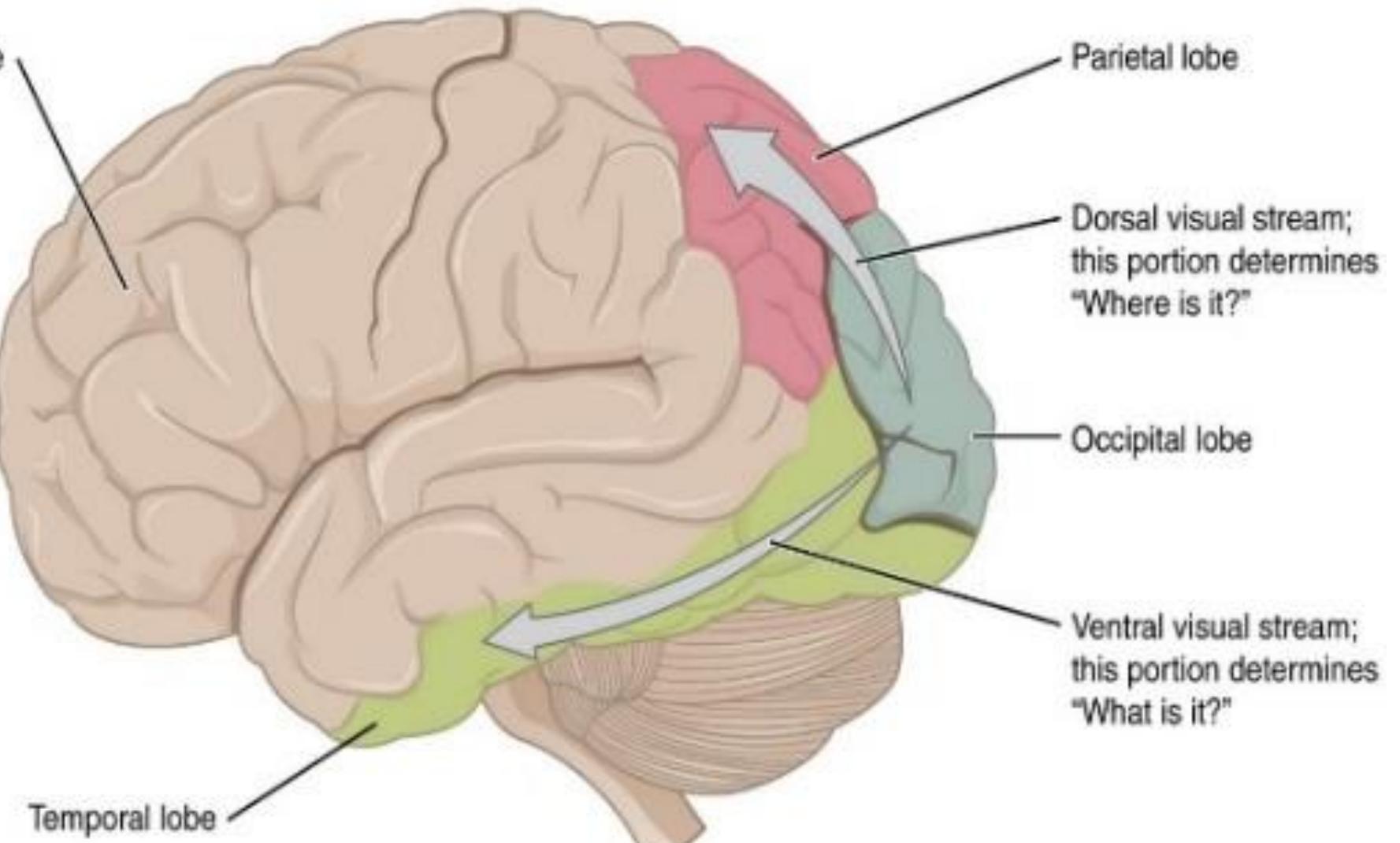
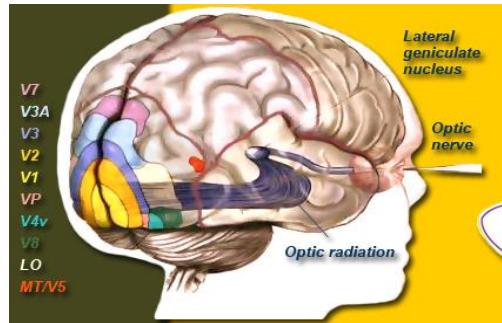
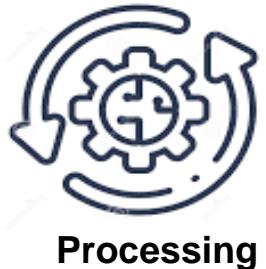


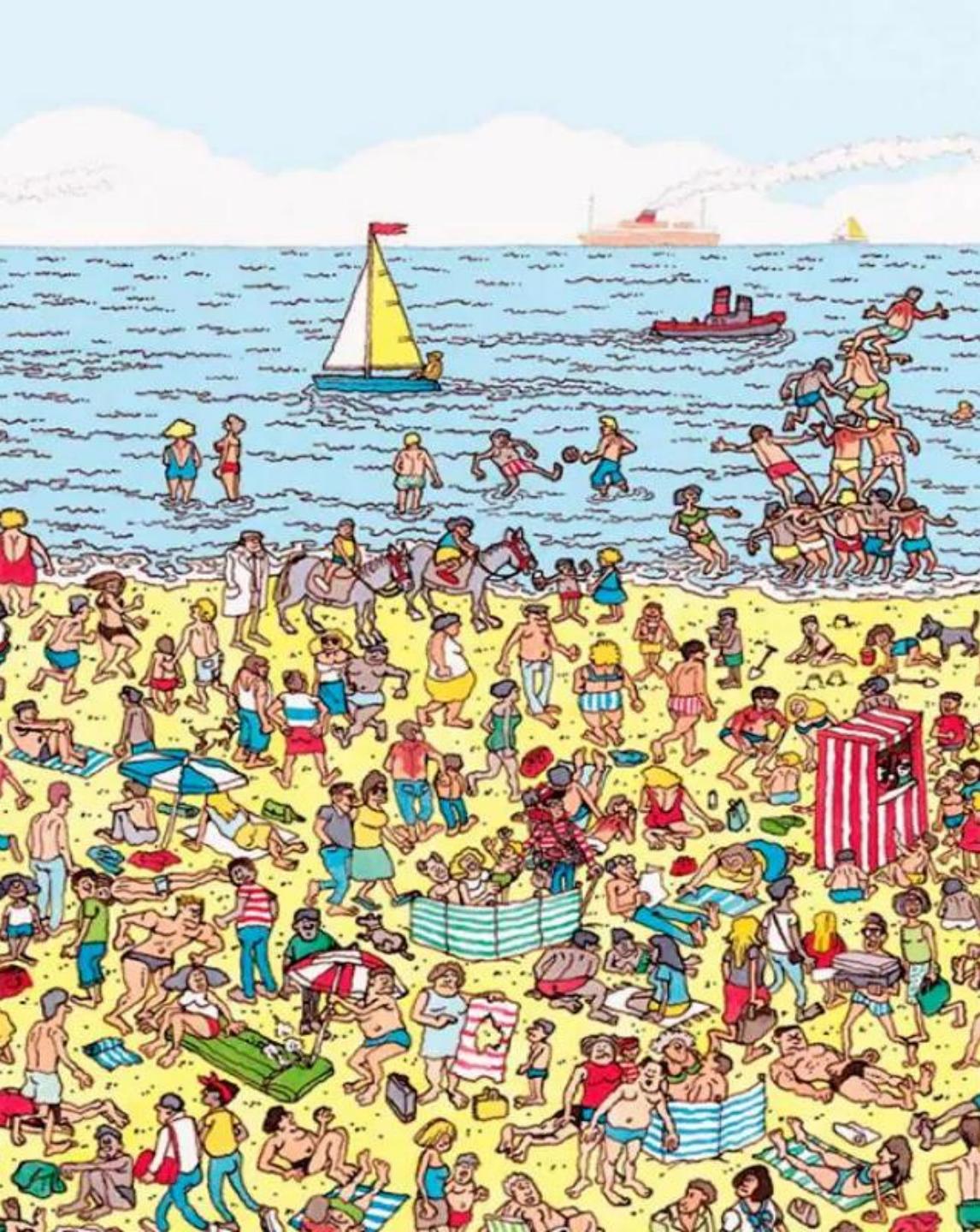
Processing

Transmission

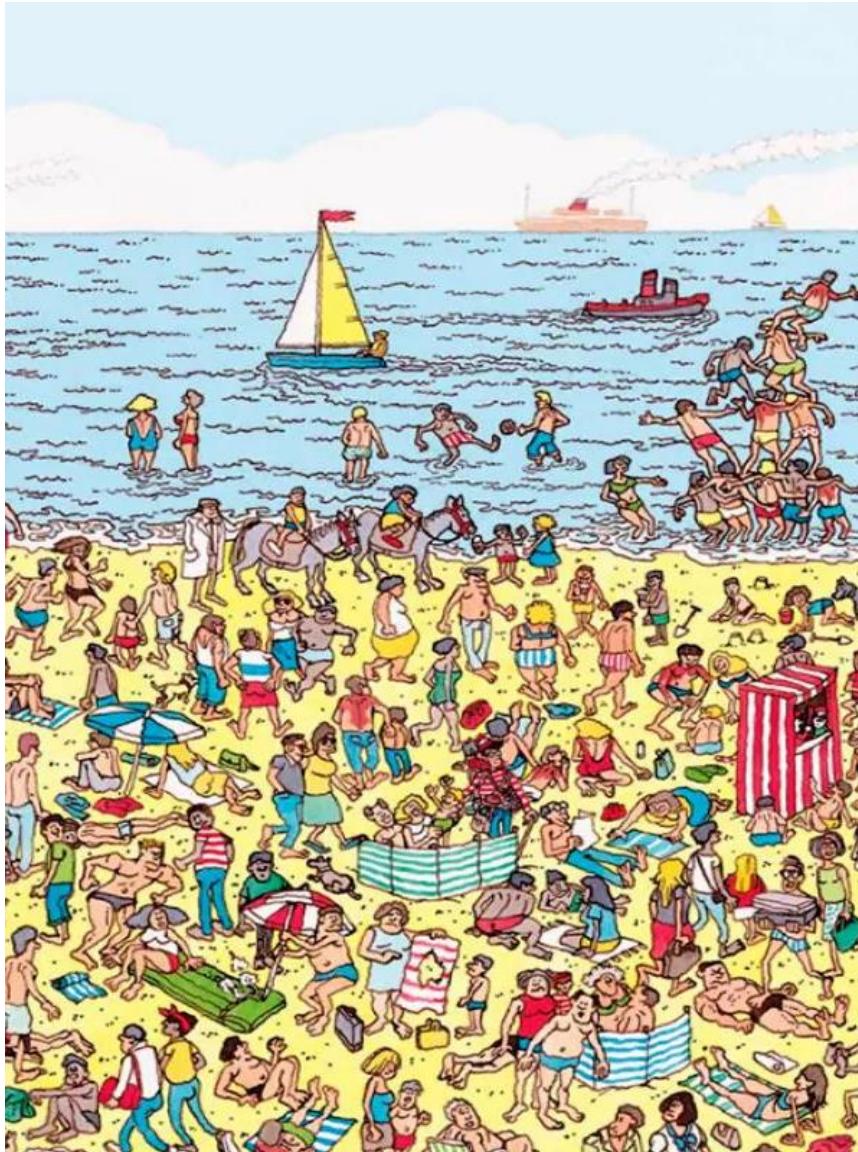


PROCESSING - FOUR LOBES IN BRAIN – HARMONY IN AUTONOMY AND INTERGRATION





- How we decides where to look and search for Wally?
- How our system decides what to process further?
- How our brain forms an object when the properties of an object is processed at different location?
- How we perform multi-tasks?



Where's Wally in Real Time !

The real complex conjunctive search

Where's Wally in Real Time ! – the self terminative search (search ends as soon as the target is found)

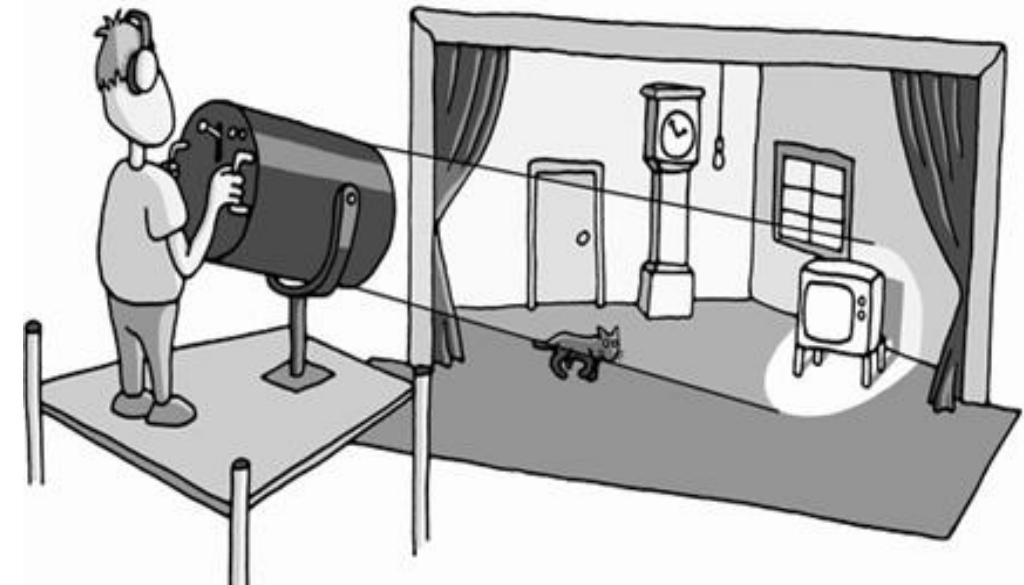
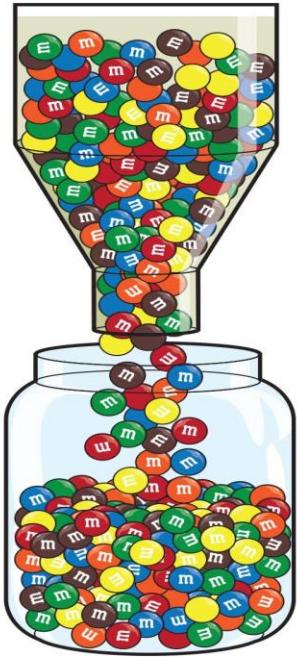
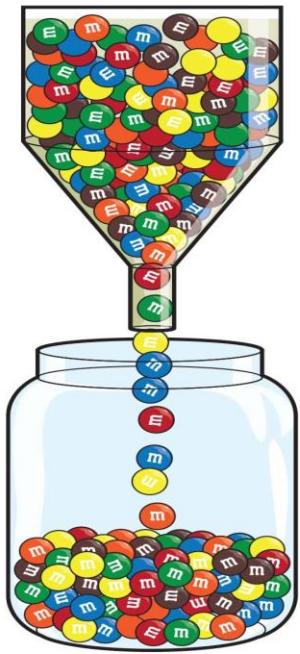


A screenshot of the BBC News website. The header features the BBC logo and navigation links for Home, News, Sport, Reel, Worklife, Travel, Future, Culture, and More. Below the header is a large advertisement for Accenture with the headline "Does technology hold the key to workplace inclusion?". The main news area has a story about India passing five million Covid cases. At the bottom, there is a search bar and a taskbar with icons for various applications.



What is Attention?

Selection, Filter, and Focus



Selection and Bottleneck - GATEKEEPER

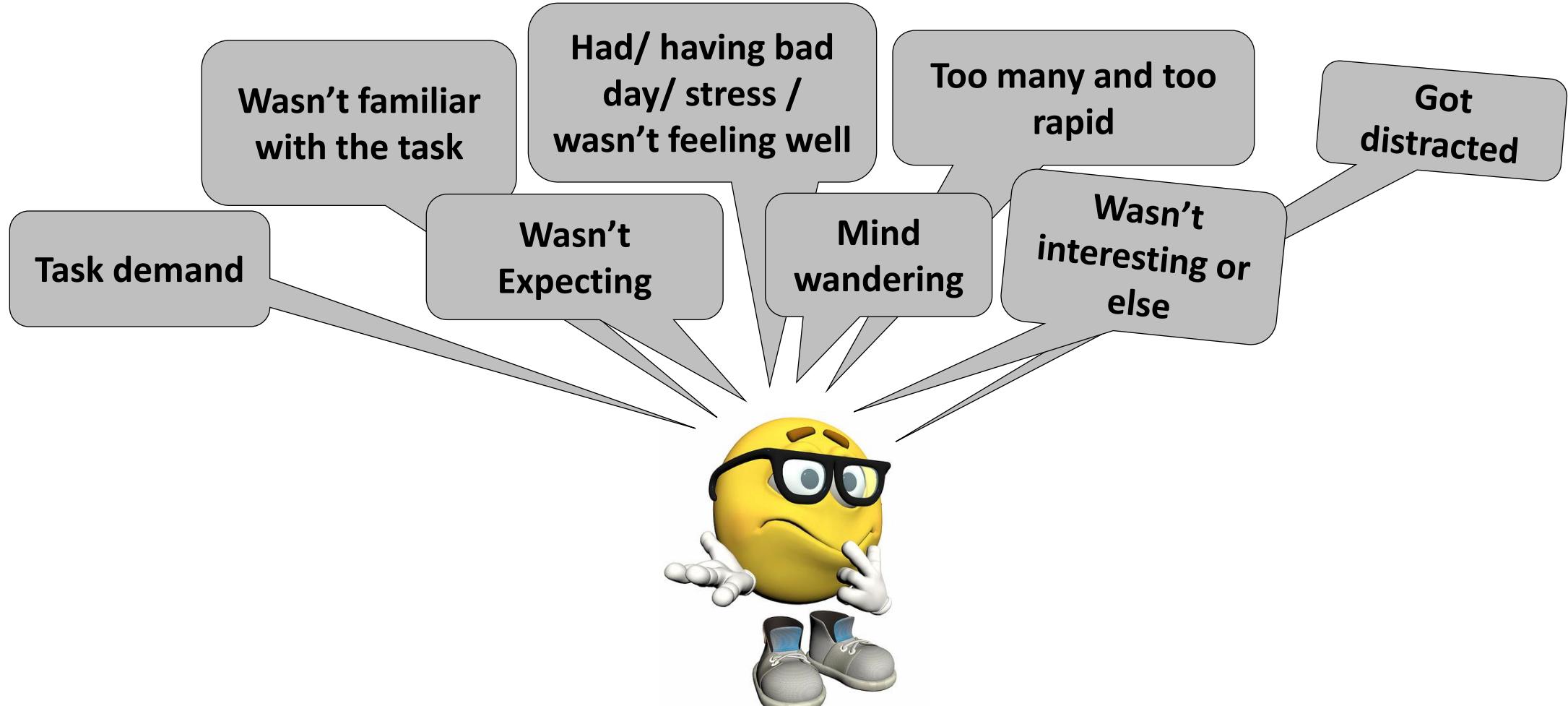
Selective Focus – SPOTLIGHT
Mental fovea – and – periphery

Enable focus on relevant information selectively while ignoring irrelevant information



(c) 2010 Daniel J. Simons

Wondering how did you FAIL to Notice Gorilla or the other changes?



Task demand, Cognitive Load, but Stress, Fatigue, Motivation, Interest, Knowledge, Belief, Emotion, and Feeling also modulates the filter and central attention

Why attention is important ?

Influence Perception

- Inattention Blindness – Failure to perceive the object that are not the focus of attention
- Change Blindness – failure to detect changes to the visual details of a scene



Why attention is important ?

Influence Perception



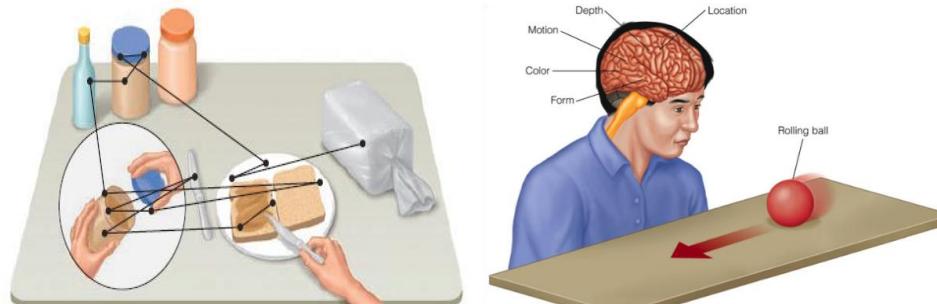
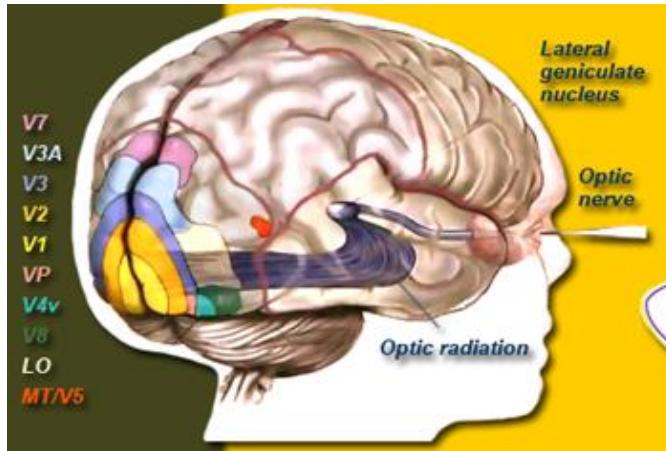
BINDING Problem

How does your brain know that red and orange color is for curtain, the two black colors are different for girls wearing black t-shirt and the Gorilla, differentiate the girls wearing white and girls wearing black t-shirt, and the two balls, of which one you were asked to track.

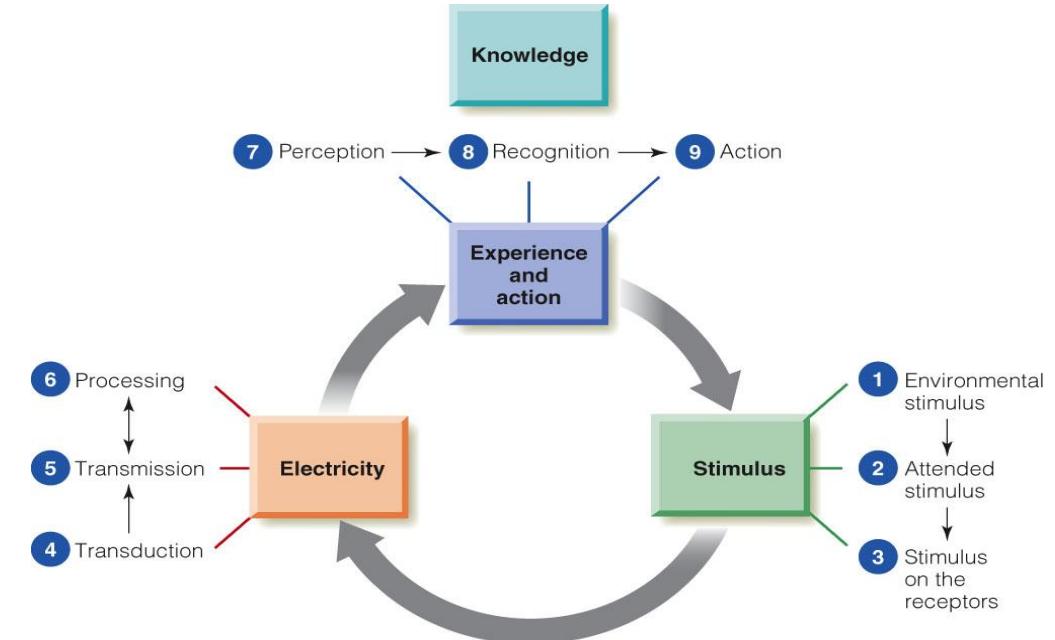
In other words, how your brain binds these various features together which are present in this complex dynamic scene?

Why attention is important ?

Influence Perception



The **BINDING PROBLEM**



The perceptual process. The steps in this process are arranged in a circle to emphasize that the process is dynamic and continually changing.

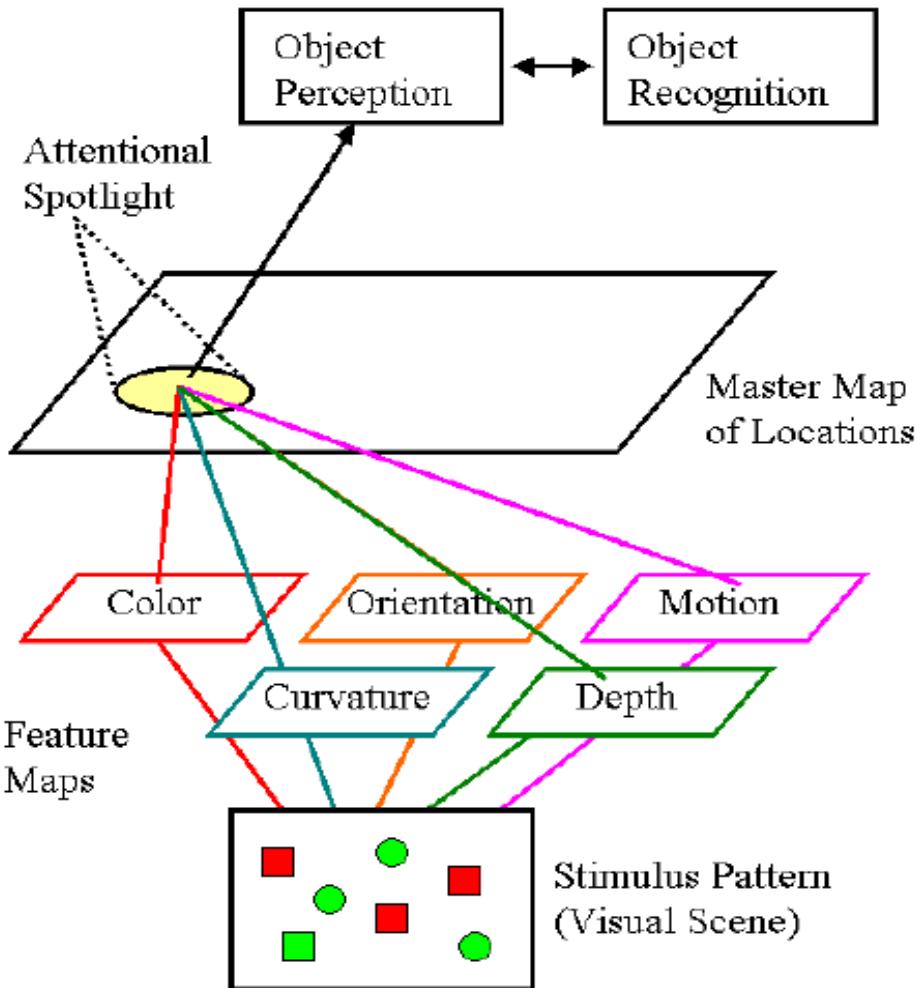
How do we bind the different features?

What happens when we fail to integrate features?

Why attention is important ?

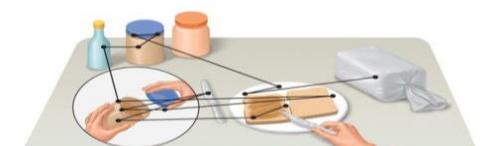
Influence Perception

Feature Integration Theory (Treisman)



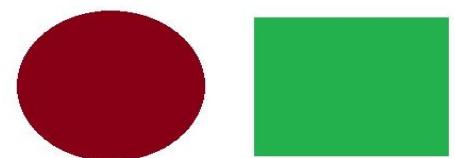
Attention work as a GLUE

When attention fails

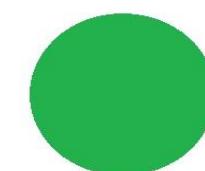


The BINDING PROBLEM

Visual stimuli shown to participant



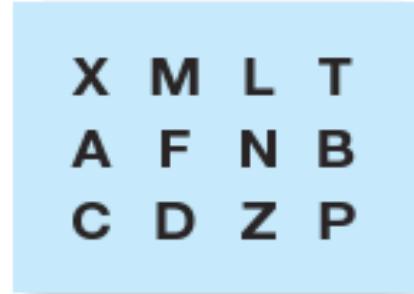
Illusory conjunction formed



Illusory Conjunction

Why attention is important ?

Influence Memory



(a) Whole report

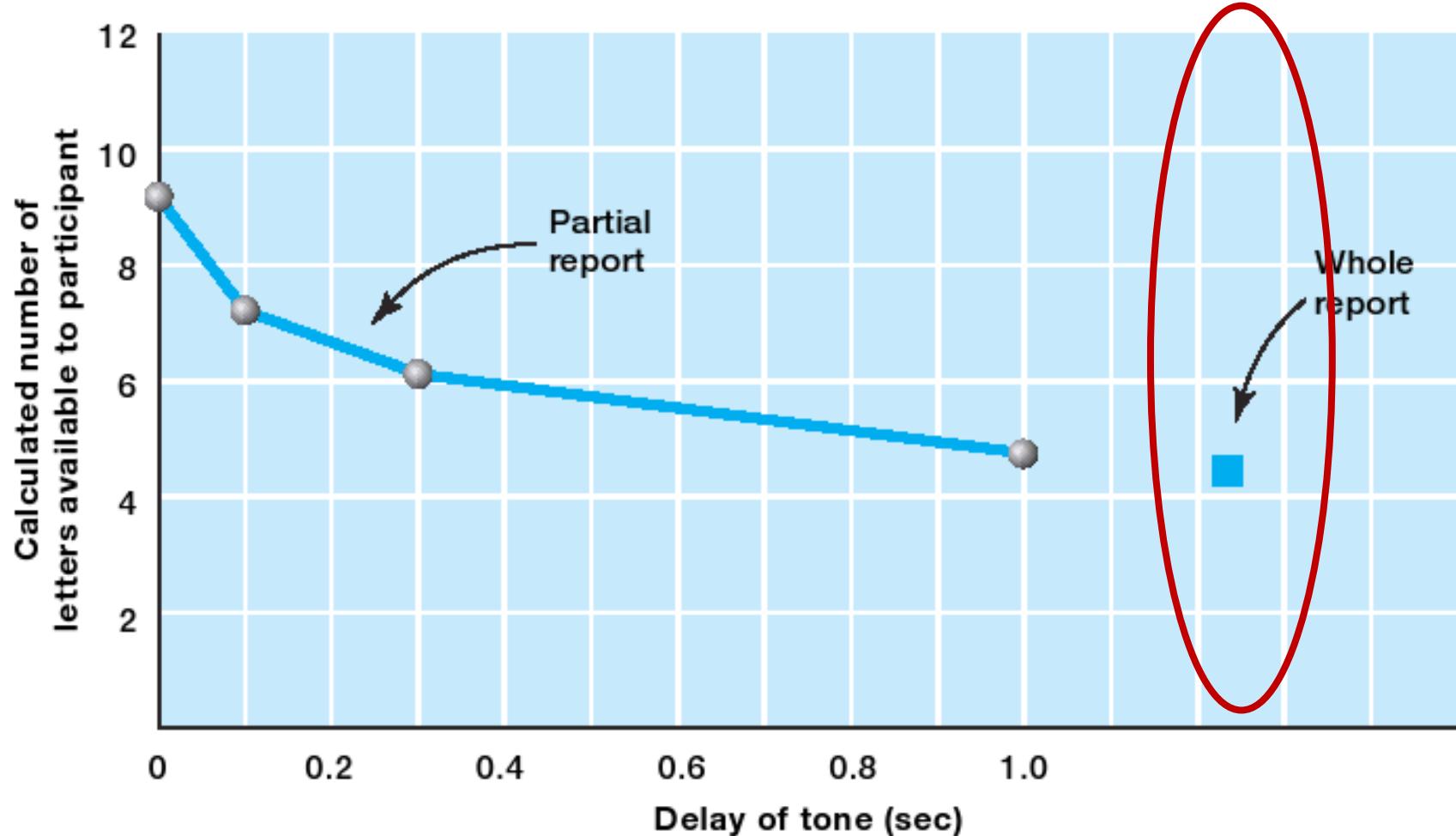
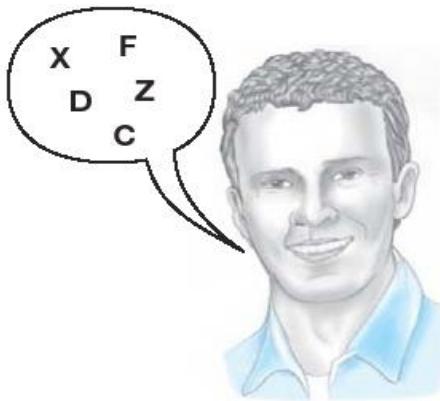


Figure 5.6 Procedure for three of Sperling's (1960) experiments. (a) Whole report procedure: Person saw all 12 letters at once for 50 msec. and reported as many as he or she could remember. (b) Partial report: Person saw all 12 letters, as before, but immediately after they were turned off, a tone indicated with row the person was to report; (c) Partial report, delayed: Same as (b), but with a short delay between extinguishing the letters and presentation of the tone.

Sperling Experiment

Why attention is important ?

Influence Memory

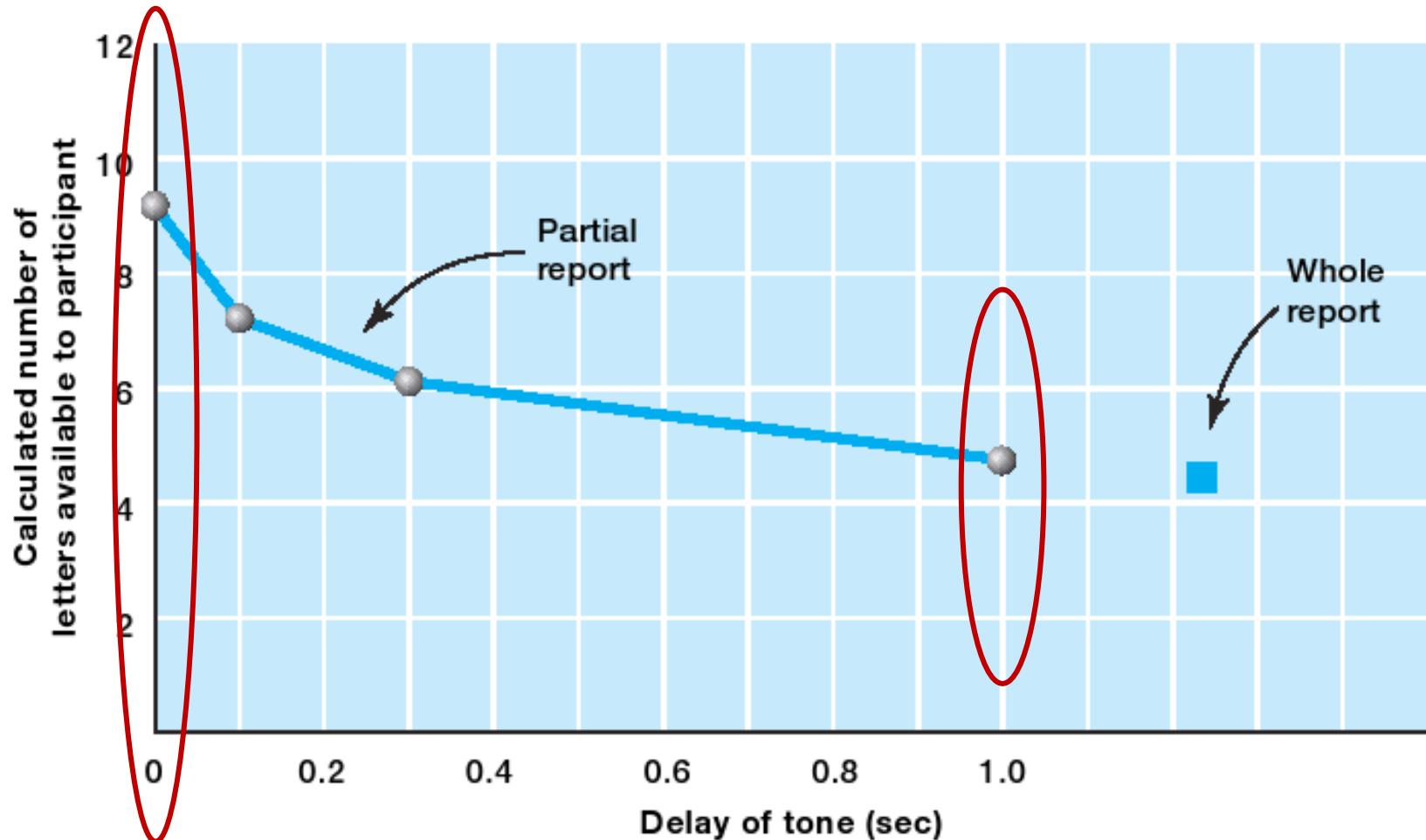
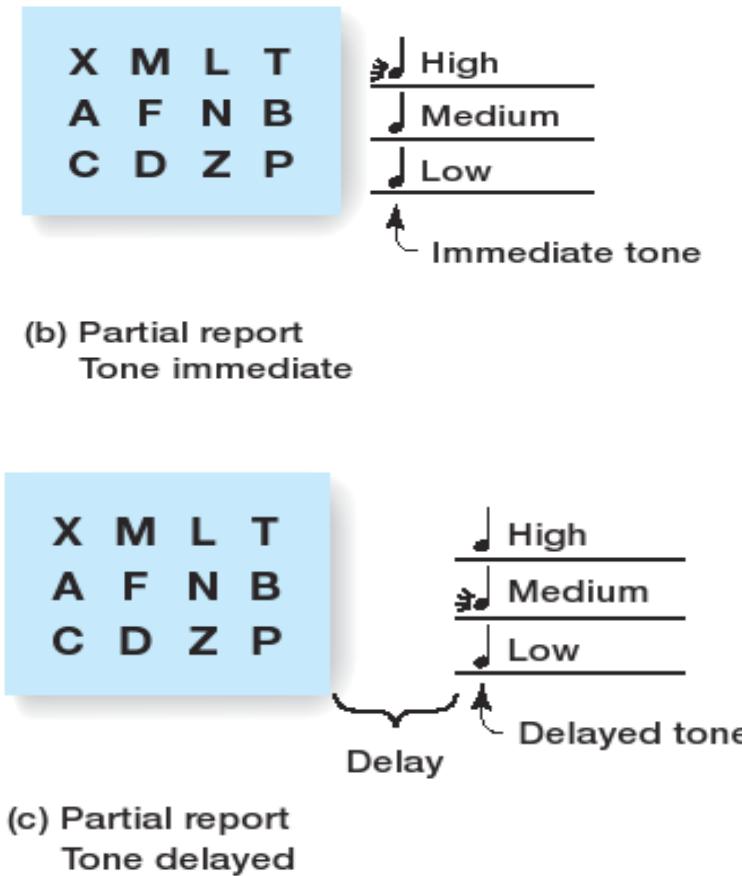
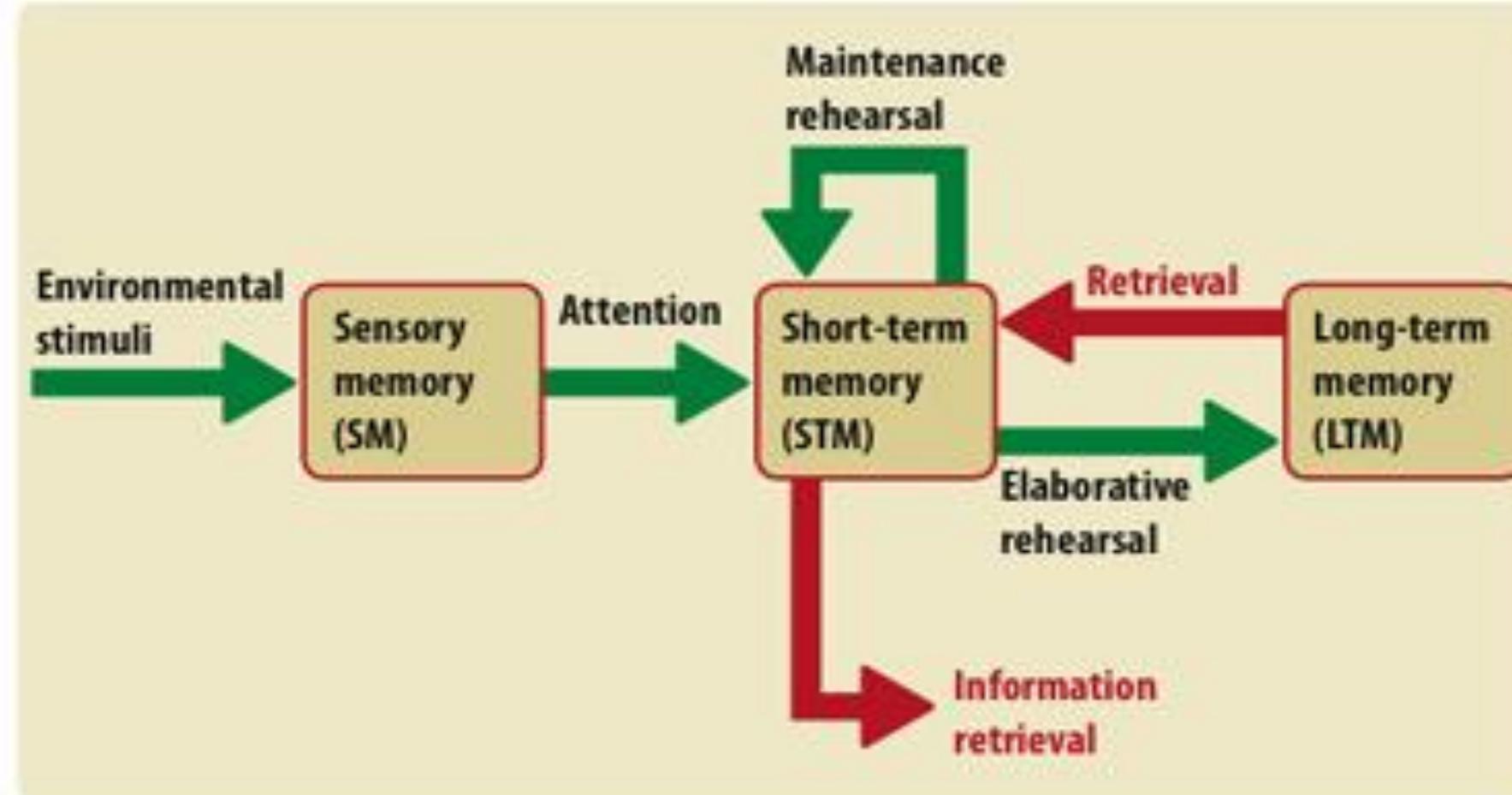


Figure 5.7 Results of Sperling's (1960) partial-report experiments. The decrease in performance is due to the rapid decay of iconic memory (called *sensory memory* in the modal model). (Reprinted from "The Serial Position Effect in Free Recall," by B. B. Murdoch, *Journal of Experimental Psychology*, 64, pp. 482-488. Copyright © 1962 with permission from the American Psychological Association.)

Sperling Experiment

Why attention is important ?

Influence Memory



Atkinson and Shiffrin, 1968

Encoding



→ Retrieval

Memory is an ability to encode, store and retrieve information.

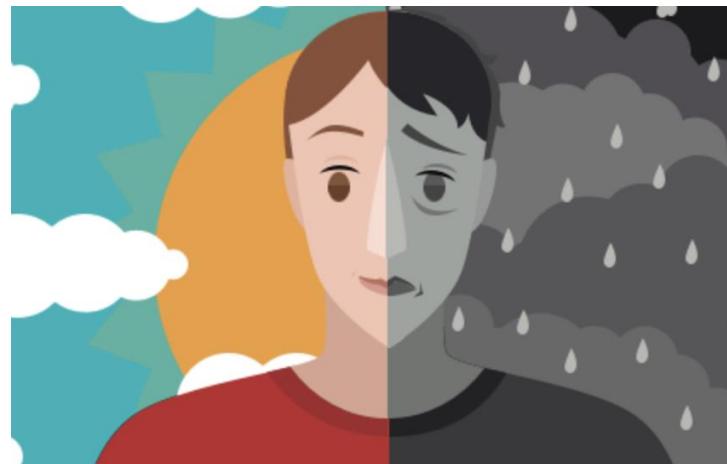
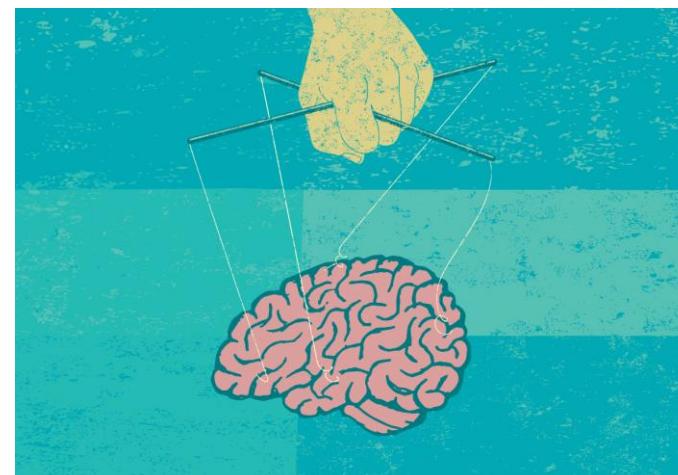
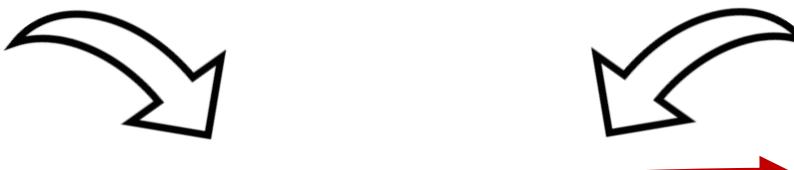
However, unfortunately its not as simple, passive and unidirectional storage as floppy. It's a lot messier, complex, and gets affected by experiences, prompters, and retrievals.

Encoding: Process of transforming the temporary information into a lasting memory of what our senses take in

Storage: process of maintaining information in memory over time, i.e. retaining the information

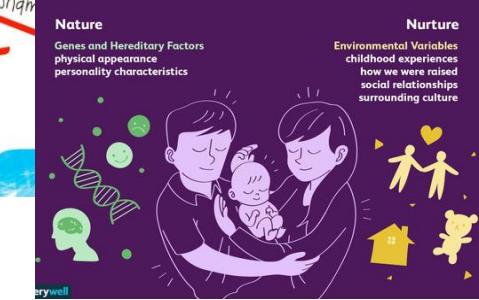
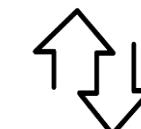
Retrieval: process of reconstructing or reactivating the experiences from our storage

Relevance



Emotion

Distinctive/ Unusual



Pre-disposition & Environment

Storage: process of maintaining information in memory over time, i.e. retaining the information

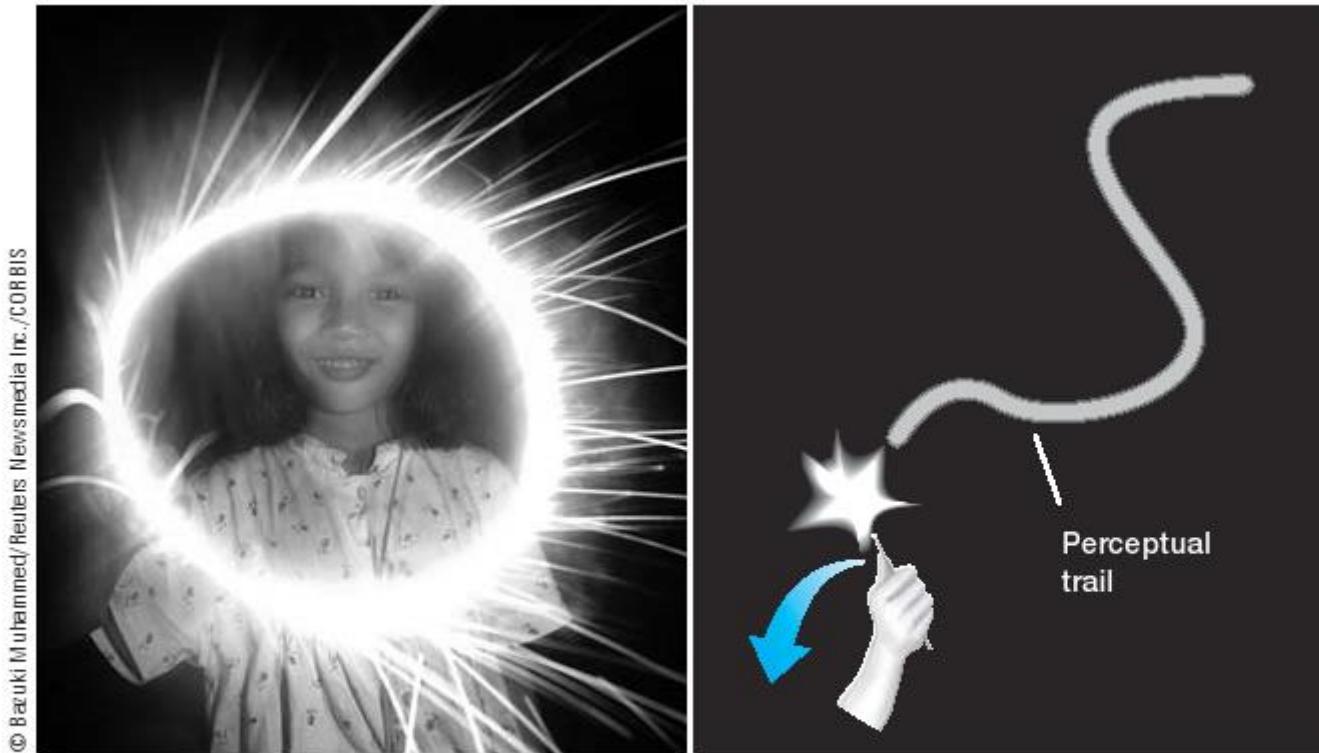
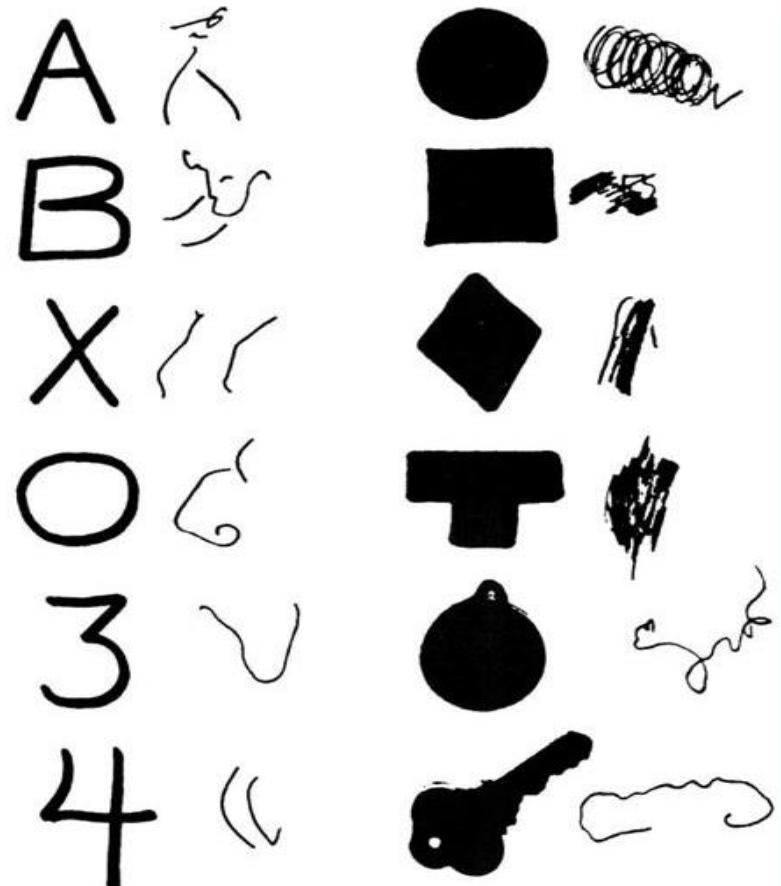
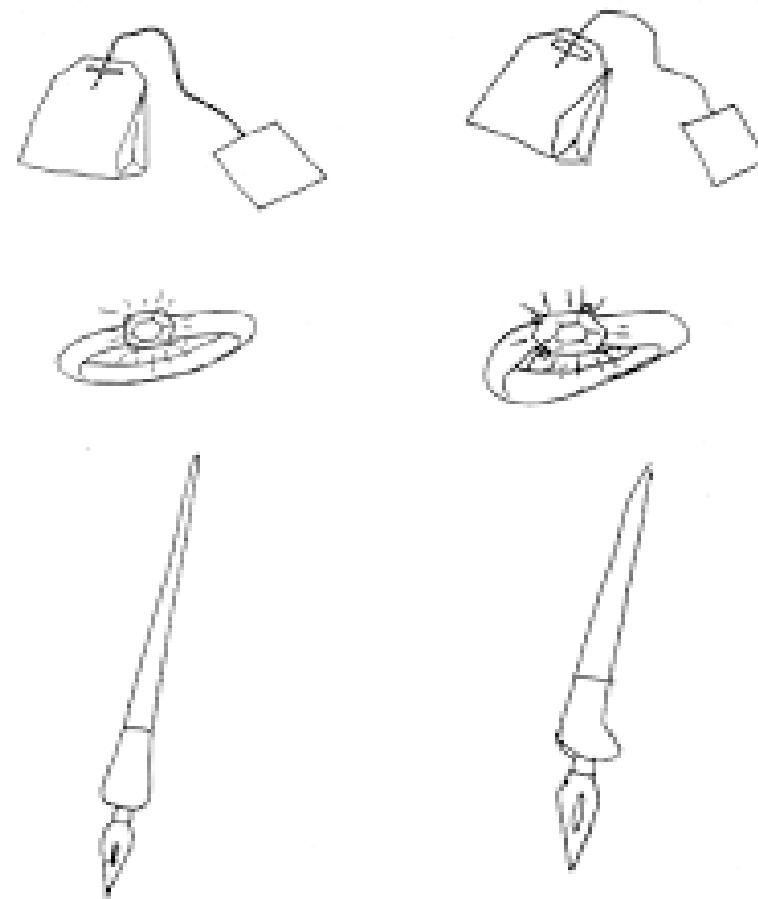


Figure 5.5 (a) A sparkler can cause a trail of light when it is moved rapidly. (b) This trail occurs because the perception of the light is briefly held in the mind.

Perceptual Problems



(Benson & Greenberg, 1969) **Apperceptive – inability to recognize simple objects**



Associative – inability to recognize complex objects

Attention Problem -Visual Neglect / Hemi Neglect

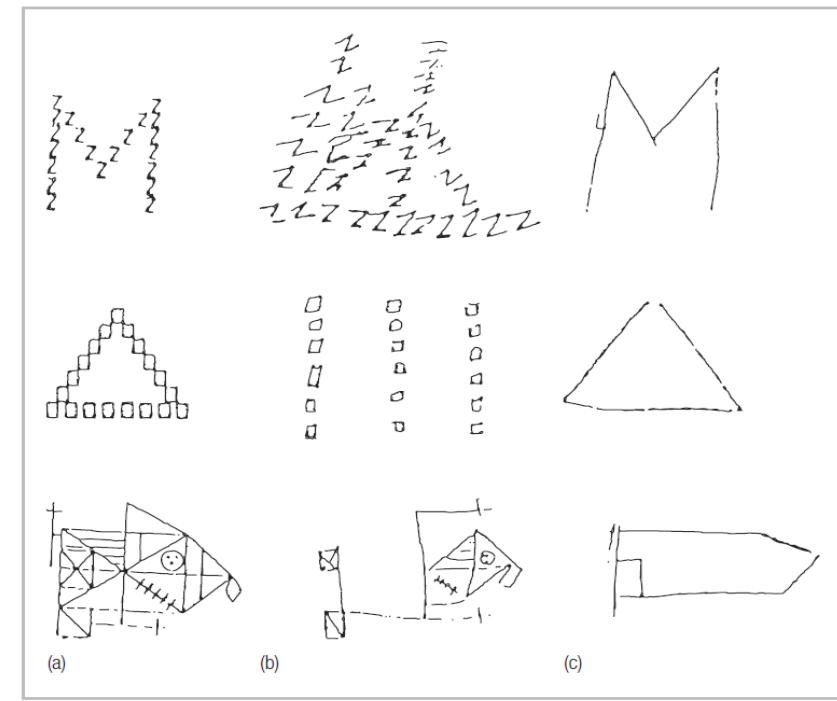
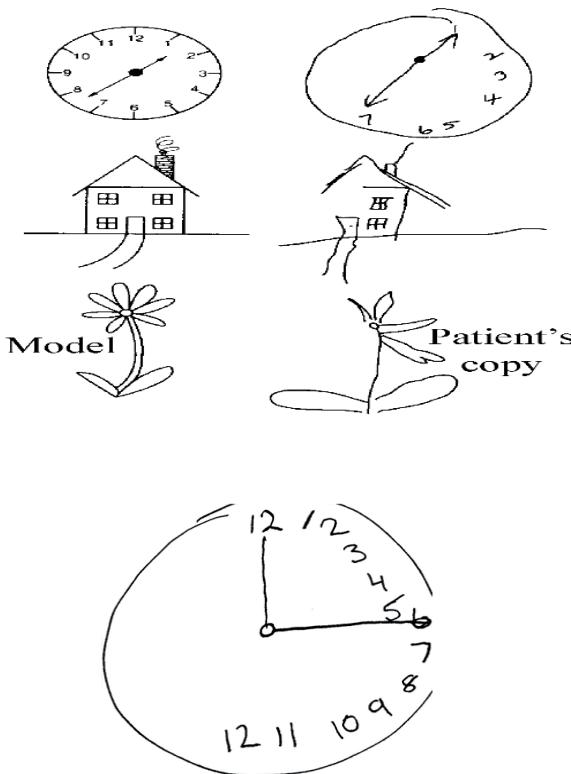
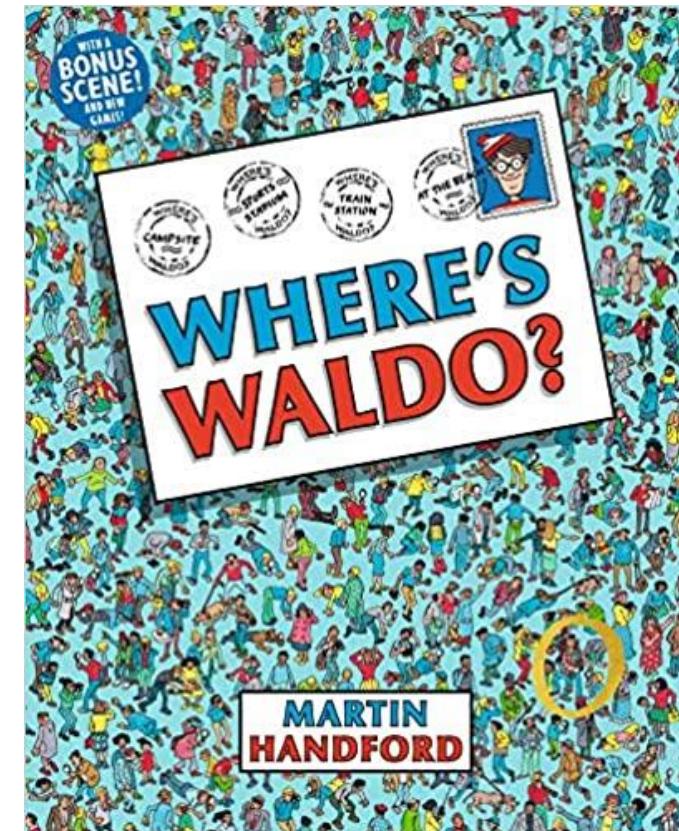
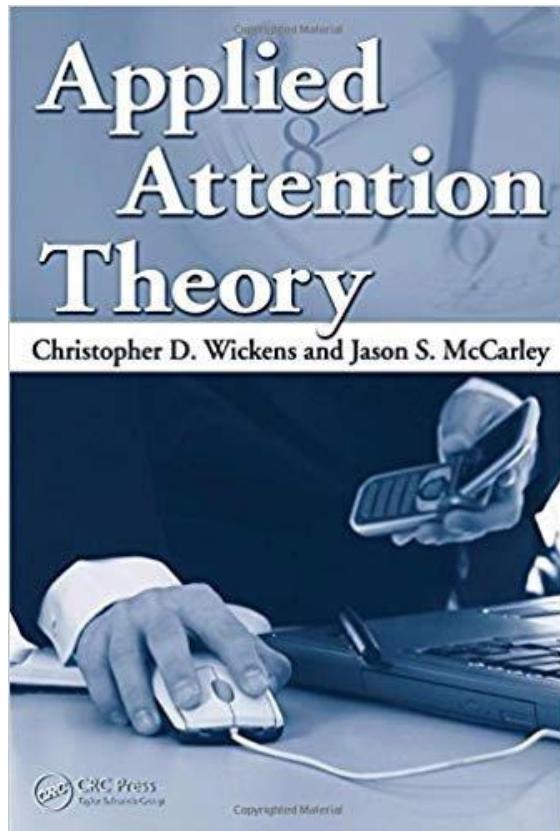


FIGURE 3.18 (a) The pictures presented to patients with parietal damage. (b) Examples of drawings made by patients with right-hemisphere damage. These patients could reproduce the specific components of the picture but not their spatial configuration. (c) Examples of drawings made by patients with left-hemisphere damage. These patients could reproduce the overall configuration but not the detail. (After Robertson & Lamb, 1991. Adapted by permission of the publisher. © 1991 by Cognitive Psychology.)

- Patients with right parietal damage shows neglect to the left visual field and they ignore to even listen to the speaker from the left side, miss to eat or explore the left side if using touch.
- Patients with parietal lobe lesions have shown problem with imagery and their contralateral side memory performance – known as representational neglect

Fun to Read!



Reference Book

