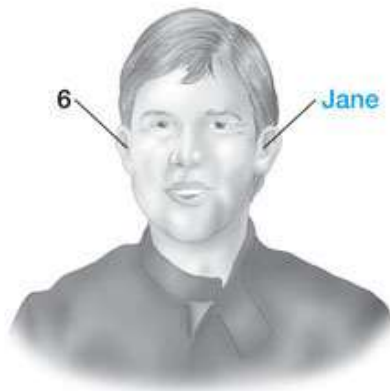
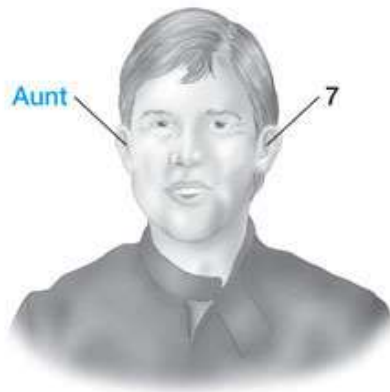


# “Cocktail party phenomenon”

- You are in a cocktail party.
- You are talking with someone intently.
- Somewhere, someone else mentions your name.
- You notice that even though your attention is fully committed to the person you were talking with.

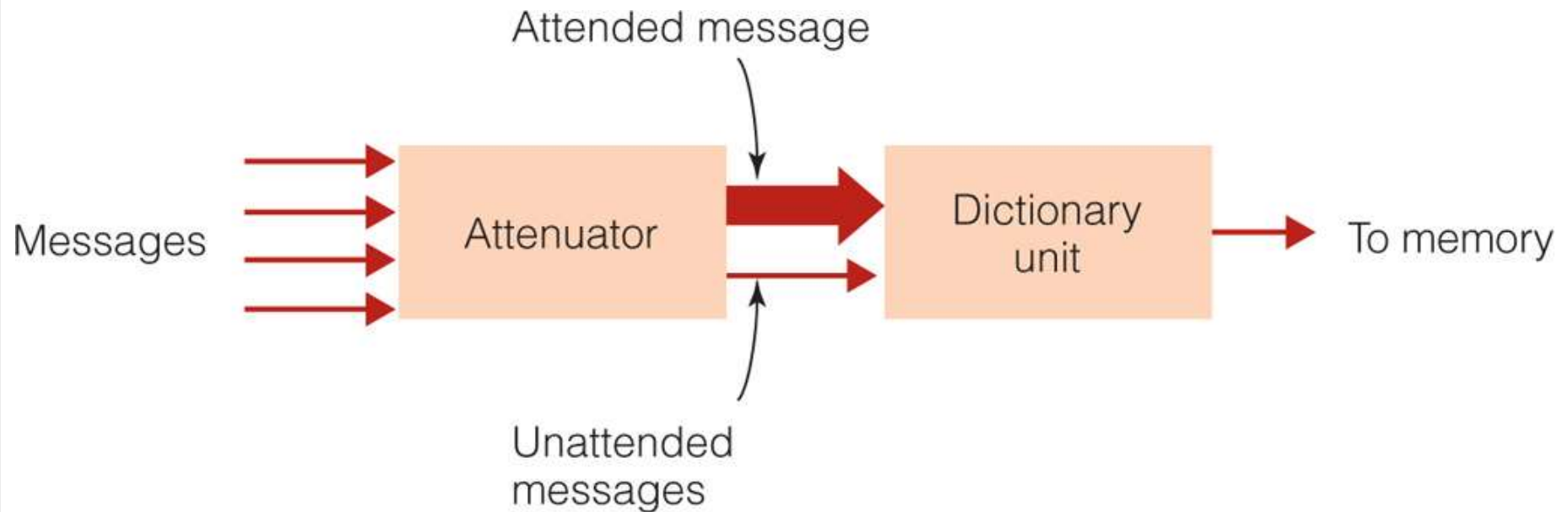


↑  
Instructions:  
Shadow this side

- Ss were asked to shadow the message received to the left ear only.

- Left ear:
  - Dear 7 Jane
- Right ear:
  - 9 Aunt 6
- Shadowing report
  - Dear Aunt Jane

# Treisman's attenuation model of selective attention.



# Tresiman's Attenuation Theory

- Intermediate-selection model
  - Attended message can be separated from unattended message early in the information-processing system
  - Selection can also occur later

# Attenuation

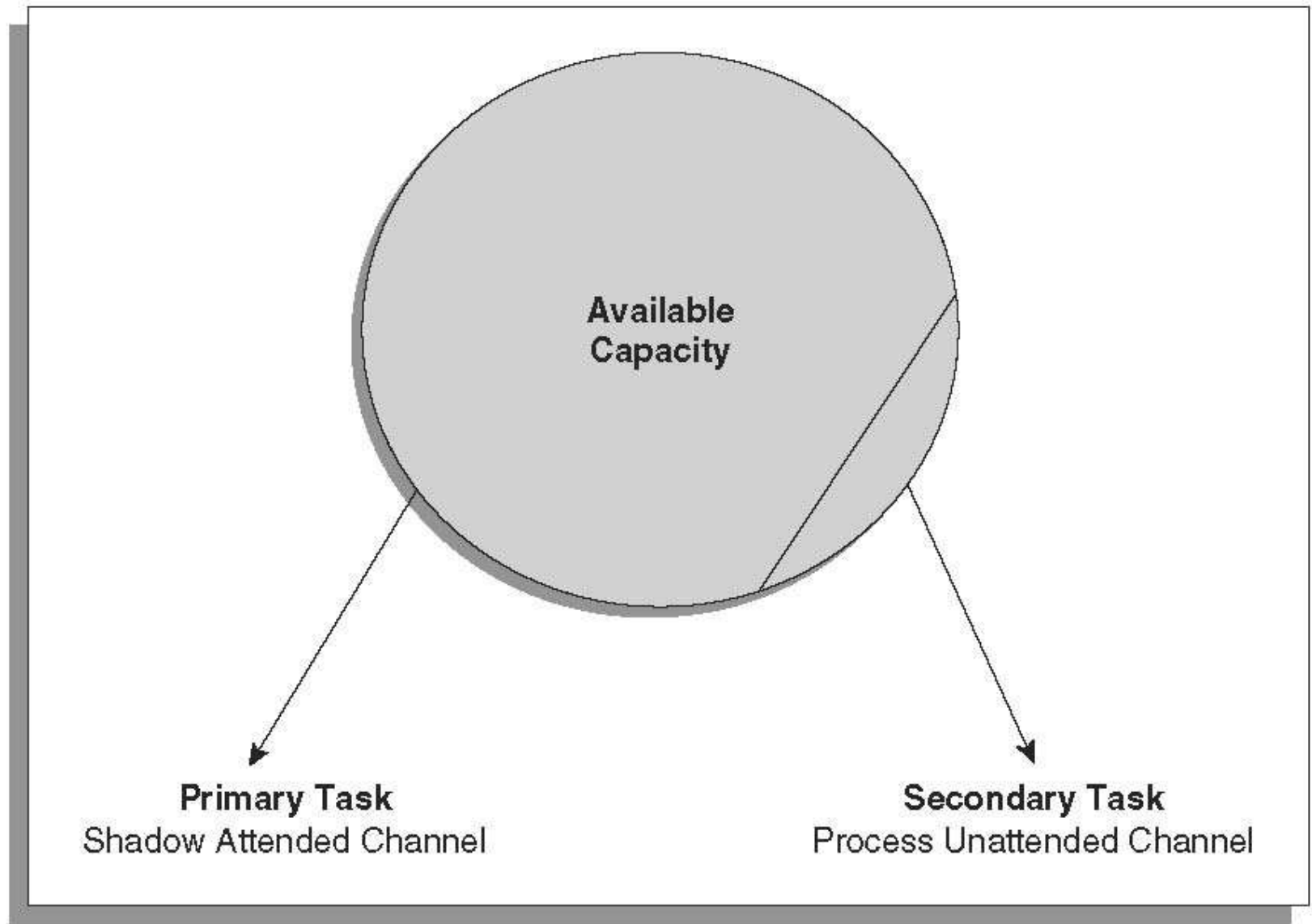
- Failures of selective attention occasionally occur—for example, noticing one's own name in the ignored message.
- An attenuation filter lowers the strength of the sensory signal in the ignored message, making it less likely to be perceived. Important stimuli—such as one's name pass through the filter without attenuation.

# Capacity Theories of Attention

- Depending on the task used, the filter seemed to be either early or late in processing. The ability to divide attention instead of selectively attend was also important to model.
- Capacity theories drop filters and assume attention is limited in overall capacity.
- **Mental effort**: the proportion of available attentional capacity given to a task.

# Capacity Theories of Attention

- **Single capacity:** Assumes attentional capacity is undifferentiated.
- **Multiple resources:** Assumes there are multiple attentional capacities.
  - auditory vs. visual perceptual modalities
  - perceptual vs. cognitive resources
  - vocal vs. manual response modalities

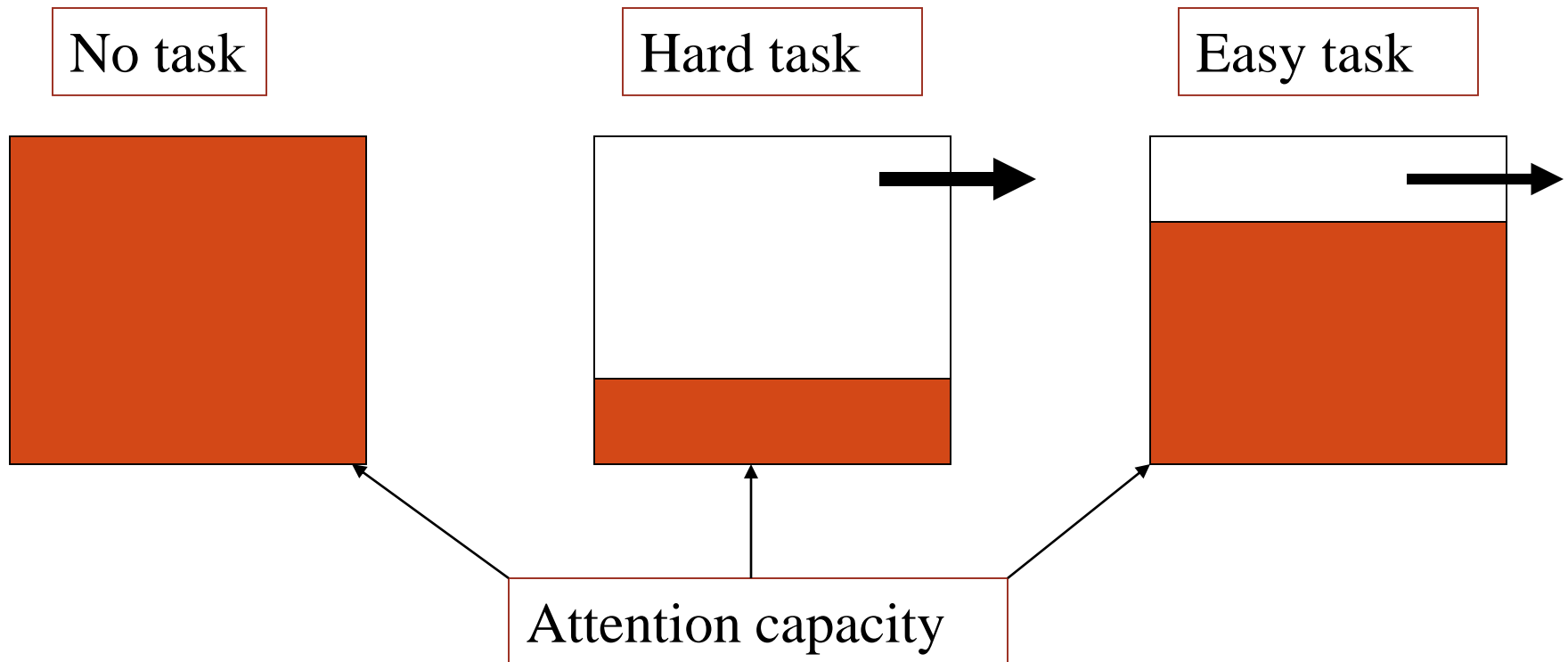


**Figure 3.6** The capacity model of attention.



# Task load and selective attention

- Attention is more like resources
  - Kahneman's (1973) capacity theory
  - When a particular task demands lots of processing resources, then other tasks get fewer resources.



1. The “cocktail party effect” refers to the fact that shadowing performance is disrupted when \_\_\_\_\_ is embedded in the unattended message.

- backward speech
- **the listener’s name**
- a section of repeated words
- Music

2. Treisman’s theory argues that “unattended” information is actually:

- blocked by a mental filter.
- **attenuated but not entirely blocked.**
- never acquired in the first place.
- processed to the level of meaning, then repressed.

- Q 3. When listening to a conversation, your attention is momentarily diverted when you hear your name spoken in a different conversation across the room. This is an example of the:

- filter effect.
- dichotic listening phenomenon.
- **cocktail party effect.**
- attenuation effect.
- Stroop effect.

Q4. Greater effort or concentration results in better performance on:

- all tasks.
- **tasks that require resource-limited processing.**
- tasks that are data-limited.
- tasks that require vigilance.

5. According to Kahneman, arousal affects the availability of mental resources for a task.

- **True**
- False

# Attention

**Divided Attention:** Process both stimuli, by giving some attention to each.

What makes a task(s) automatic?

- Practice enables people to simultaneously do two things which at first were difficult
  - E.g., driving and singing
    - After hours of practice, you can drive and sing.
- How does that happen?
- What makes a task(s) automatic?

# What makes a task(s) automatic?

- **Dual-task performance:** with large amounts of practice, we can learn to perform two tasks (like taking dictation and reading for comprehension) at once.
- If you can transfer task information from short term memory to long term memory, you can make the task automatic.
- In general, though, dividing our attention hurts performance, especially when driving a car.

- Schneider and Shiffrin (1977)
  - Divided attention between remembering target and monitoring rapidly presented stimuli
    - Memory set: 1-4 target characters
    - Test frames: could contain random dot patterns, a target, distractors





(a) Present target stimulus in memory set

---



(b) Present series of 20 test frames (fast!)

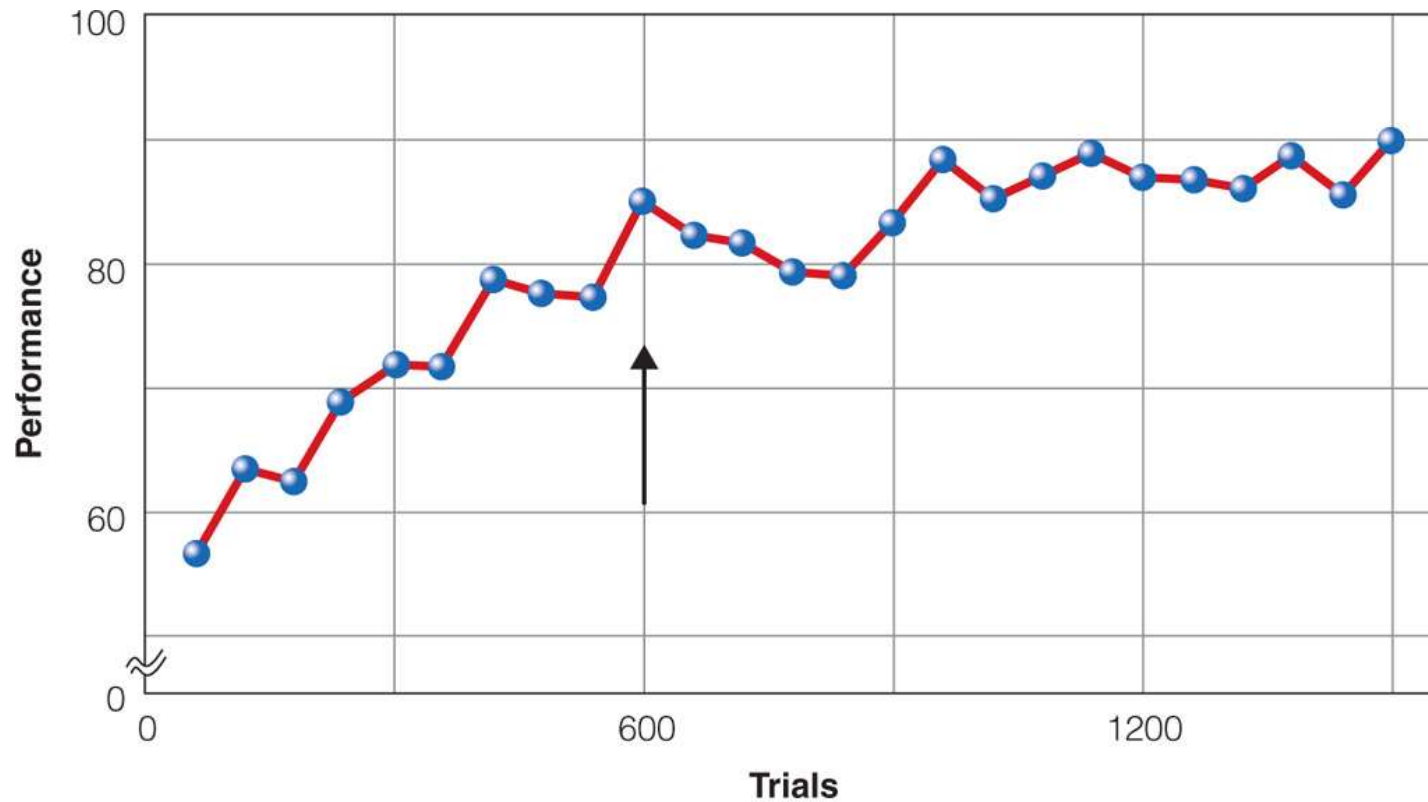
---

(c) Was target from memory set present in a frame?

---

(c)2011 Cengage Learning

Caption: Consistent mapping condition for Schneider and Shiffrin's (1977) experiment.



(c)2011 Cengage Learning

Caption: Improvement in performance with practice in Schneider and Schiffrin's (1977) experiment. The arrow indicates the point at which participants reported that the task had become automatic. This is the result of experiments in which there were four target stimuli in the memory set and two stimuli in each frame.

- Consistent mapping condition: target would be numbers, and distractors would be letters
- Over time, participants became able to divide their attention
- Automatic processing occurs without intention and only uses some of a person's cognitive resources

## Divided Attention: Process both stimuli, by giving some attention to each.

- Stroop effect:
  - The Stroop effect is a phenomenon that occurs when you must say the color of a word but not the name of the word. For example, blue might be printed in red and you must say the color rather than the word.
  - Name of the word interferes with the ability to name the ink color
  - Cannot avoid paying attention to the meanings of the words

# Stroop Effect

YELLOW BLUE ORANGE

BLACK RED GREEN

PURPLE YELLOW RED

ORANGE GREEN BLUE

BLUE RED PURPLE

YELLOW RED GREEN

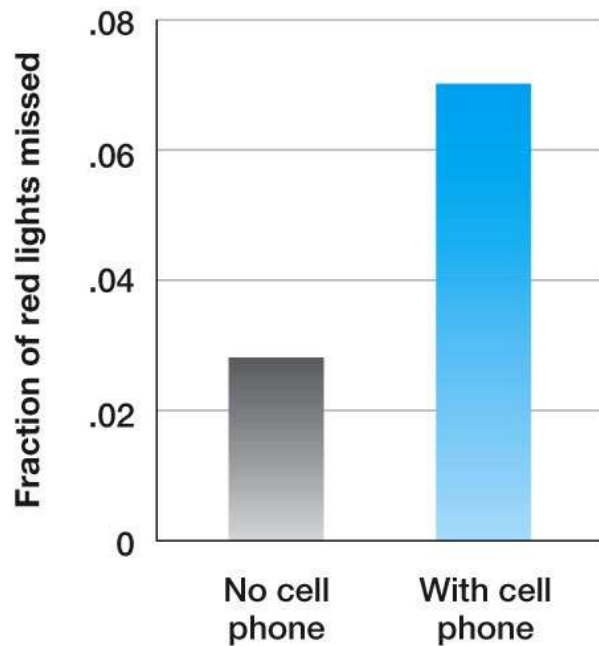
# Divided Attention

- **Controlled processing:** participants paid close attention, and their search was slow and controlled

- Strayer and Johnston (2001)
  - Simulated driving task
  - Participants on cell phone missed twice as many red lights and took longer to apply the breaks
  - Same result using “hands-free” cell phone

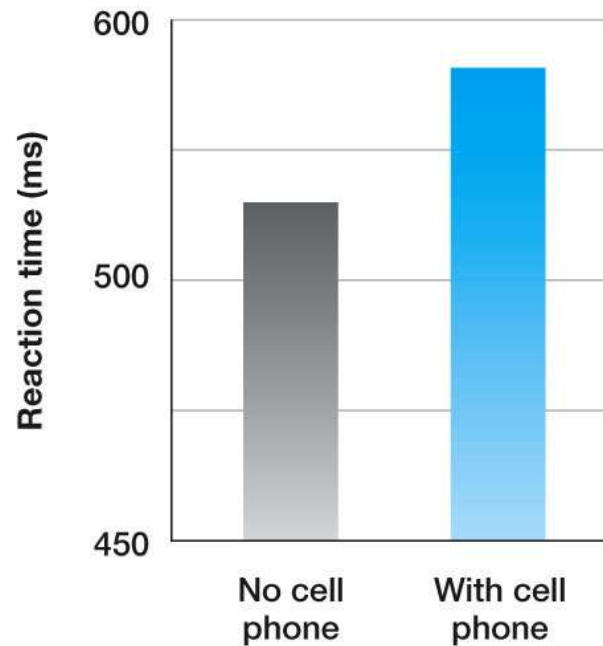
# Divided Attention

- 100-Car Naturalistic Driving Study
- Risk of accident is four times higher when using a cell phone



(a)

© 2007 Thomson Higher Education



(b)



Don't talk and drive!



Q1. . Greater effort or concentration results in better performance on:

- all tasks.
- **tasks that require resource-limited processing.**
- tasks that are data-limited.
- tasks that require vigilance.

Q2. Stroop interference lessens when:

- participants are better readers.
- **participants are given more practice at naming colors.**
- participants are girls rather than boys.
- participants are encouraged to focus carefully.

Q3 The Stroop task involves an inability to read color names.

- True
- **False**

Q4. Automatic processes involve intention and conscious awareness.

- True
- **False**

Q5. Talking to a passenger in a car is just as dangerous as talking on a cell phone while driving.

- True
- **False**

# How attention and visual perception are related?

- We are typically aware of only either the most salient parts of a visual scene or the parts that we are actively paying attention to.

# Attention and Visual Perception

- **Inattentional blindness**: a stimulus that is not attended is not perceived, even though a person might be looking directly at it.

Or

- **Inattentional blindness** is the failure to notice a fully-visible, but unexpected object because attention was engaged on another task, event, or object.

# Attention and Visual Perception

- **Change blindness**: if shown two versions of a picture, differences between them are not immediately apparent/obvious.
- **Change blindness** is a perceptual phenomenon that occurs when a **change** in a visual stimulus is introduced and the observer does not notice it. For example, observers often fail to notice major differences introduced into an image while it flickers off and on again.



# Change blindness



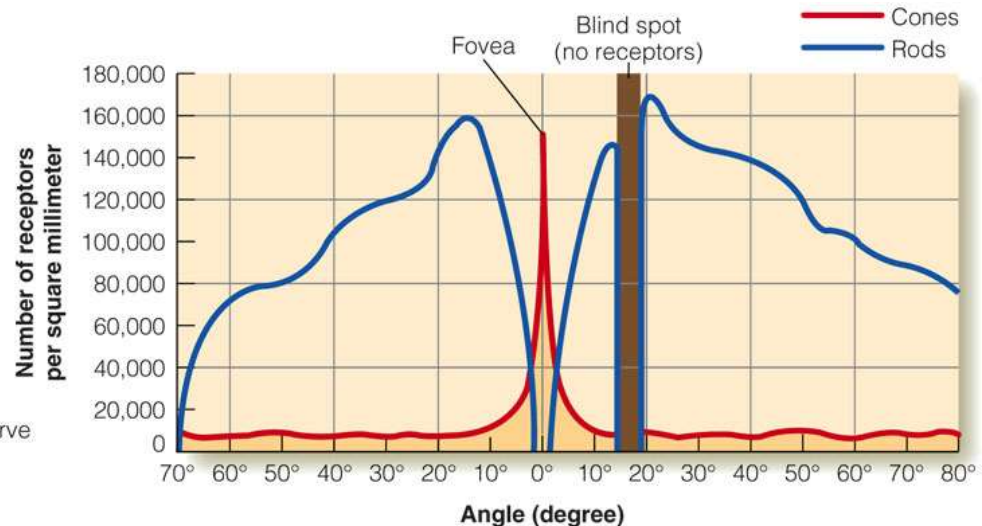
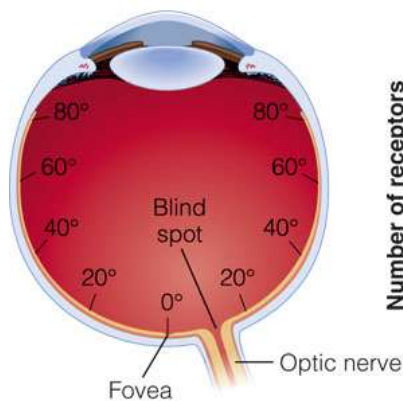
# Visual Attention

- Visual attention and eye movement
- Eye tracker
- Eye tracking machine and demo



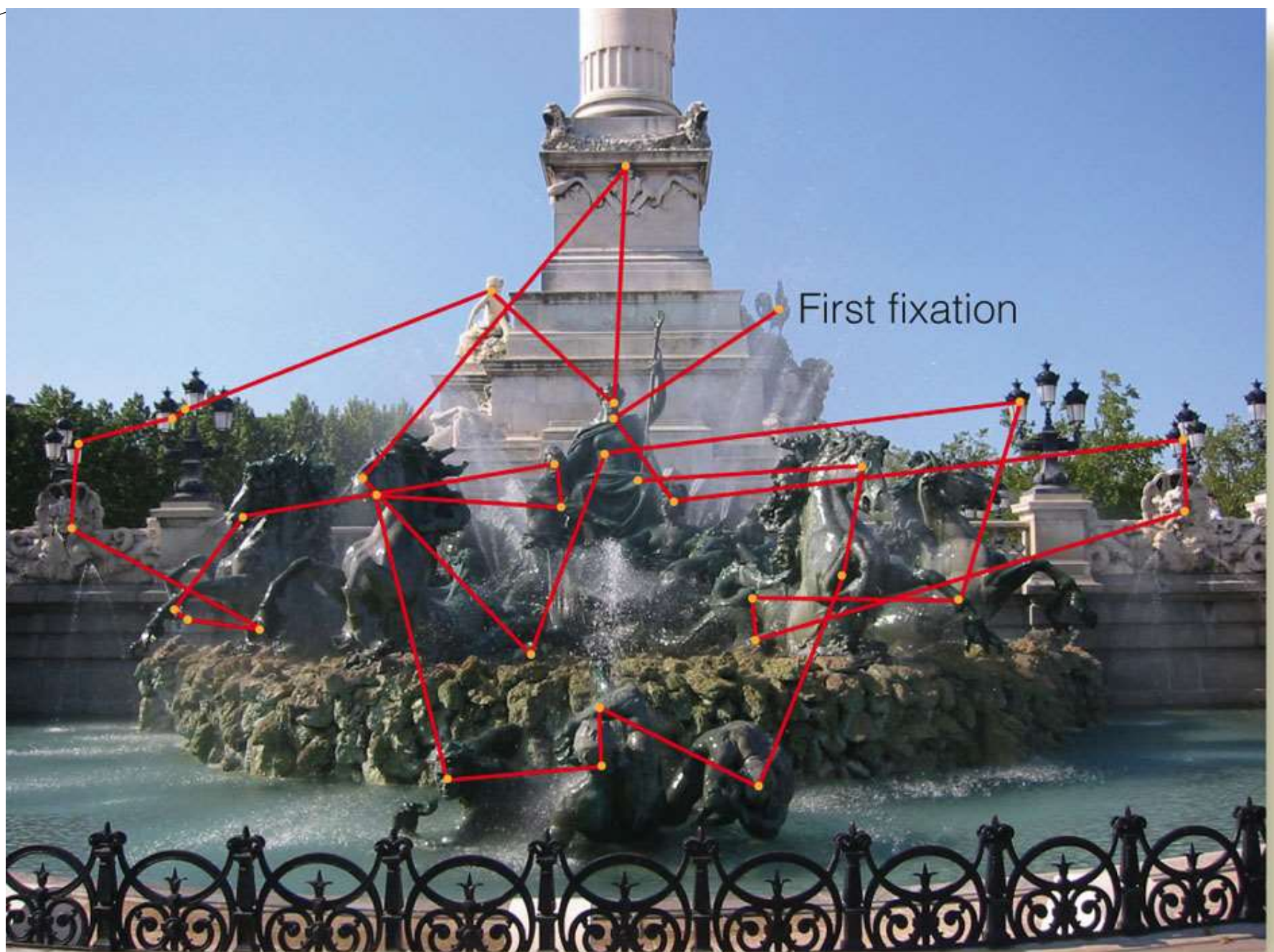


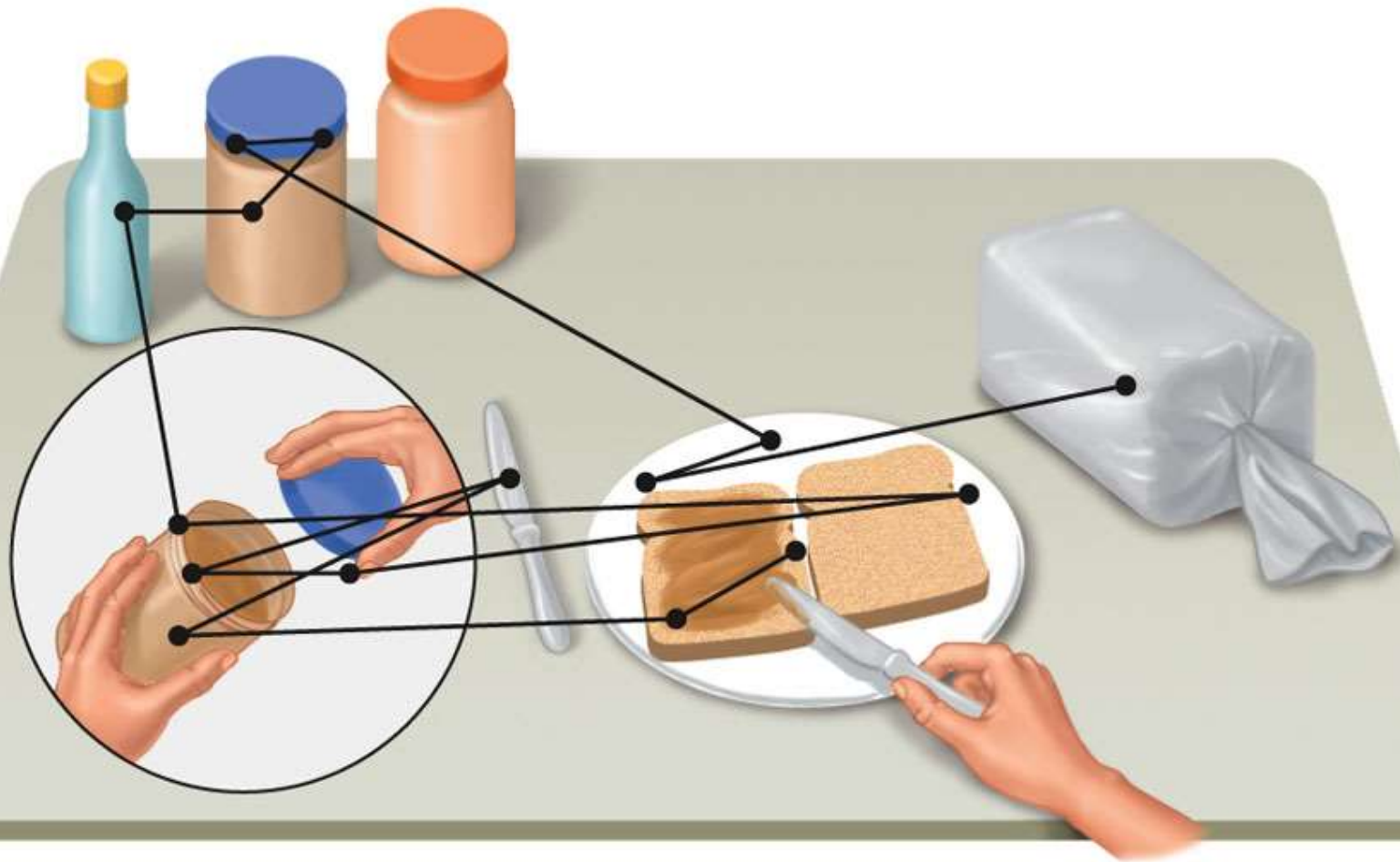
- Attention helps select information.
- This is necessary because of the way the eye is structured.
  - Most cones reside around the fovea.
  - To get accurate information about a scene, we need to select carefully particular parts of the scene.









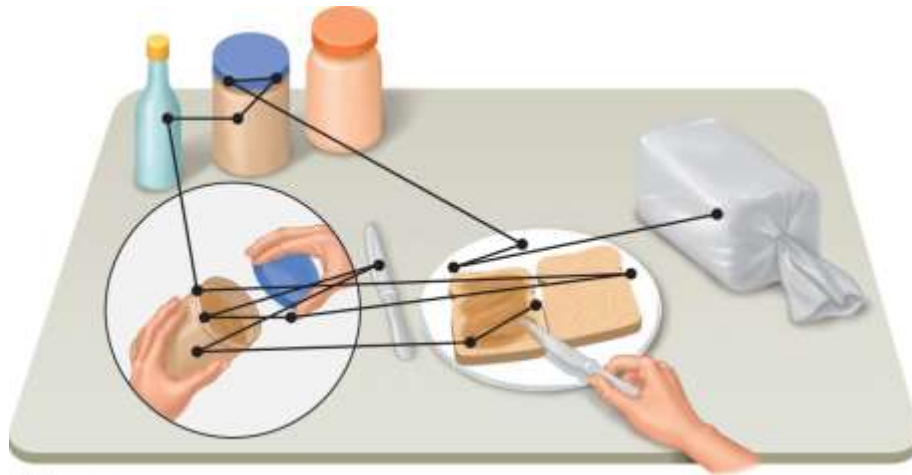


# Attention and Visual Processing

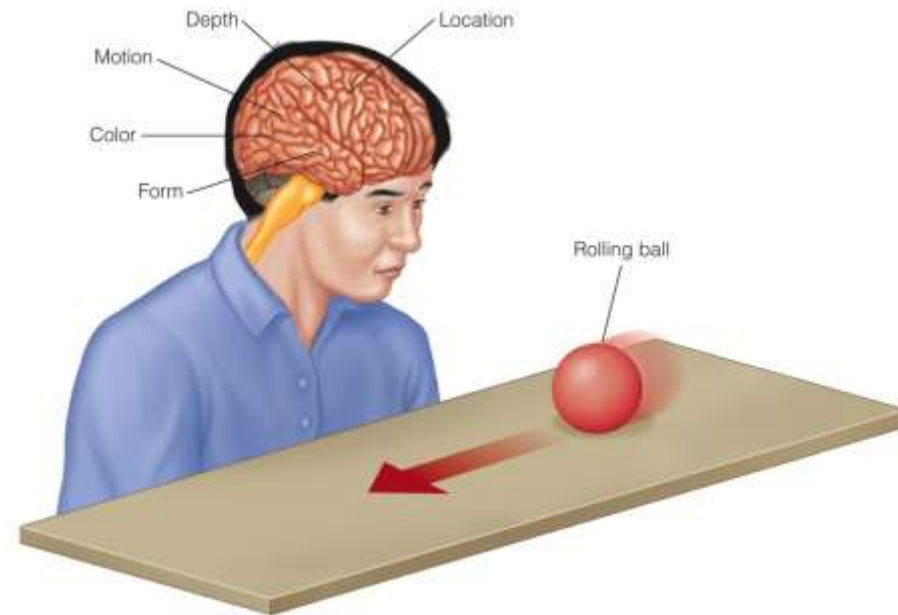
- **Saccades** – rapid movements of the eyes from one place to another
- **Fixations** – short pauses on points of interest
- Studied by using an eye tracker

# Binding problem

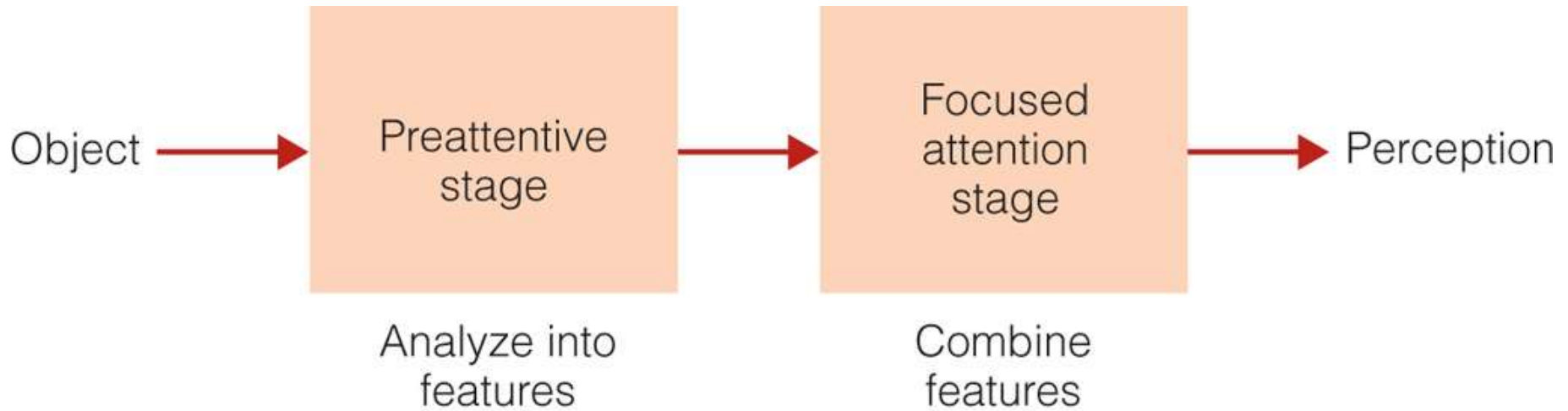
- Visual features are assessed in a piece-meal fashion.
- How do you integrate those?



©2011 Cengage Learning



© 2007 Thomson Higher Education



(c)2011 Cengage Learning

Caption: Steps in Treisman's feature integration theory. Objects are analyzed into their features in the preattentive stage, and then the features are combined later with the aid of attention.



# Feature Integration Theory (FIT)

- Preattentive stage
  - Automatic
  - No effort or attention
  - Unaware of process
  - Object analyzed into features
- Focused attention stage
  - Attention plays key role
  - Features are combined



# Attention and Visual Processing

- Stimulus salience — areas which stand out and attract attention
  - Bottom-up process
- Scene schema
  - Top-down process

# Attention (as executive function)

- Planning
- Rational thinking
- Controlling one's emotion

?

- Human
  - **Executive control**: the ability to carry out goal-directed behavior using complex mental processes and cognitive abilities (such as working memory and impulse inhibition).
  - **Metacognitive ability** (controlling your own attention / cognition) and deploying your cognitive resources to achieve goals.

Q1. Treisman's feature integration theory argues that:

- \*a. we perceive objects in two distinct stages.
- b. we can only process one piece of information at a time.
- c. we have a flexible capacity for processing information.
- d. controlled processes do not interfere with each other the way automatic processes do.
- e. "unattended" information is never really processed at any level.

Q2. Which of these subfunctions of attention, modulated by dopamine release, is most affected by diseases such as schizophrenia?

- Orienting
- \*Executive attention
- Vigilance
- Alerting

Q3. The failure to detect that an object has moved or disappeared is

- Neglect
- Prosopagnosiac.
- Alexiad.
- **Change blindness**
- Balint's syndrome

Q4. Inattentional blindness occurs when

- **there is lack of attention to an unexpected object**
- multitasking fails
- competing stimuli divert our attention from our main focus
- both a & c