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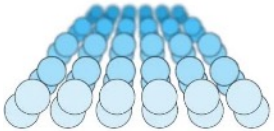
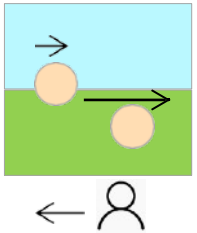
Review

Monocular depth cues

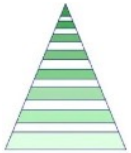
(a) Texture gradient



(b) Motion parallax

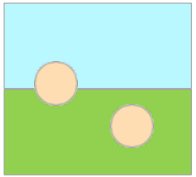


(c) Perspective convergence

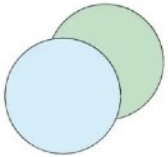


(d) Accretion and deletion

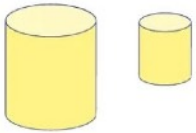
(e) Relative height



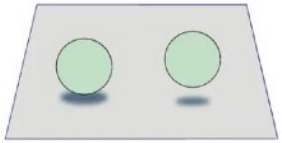
(f) Occlusion



(g) Relative size



(h) Shadows

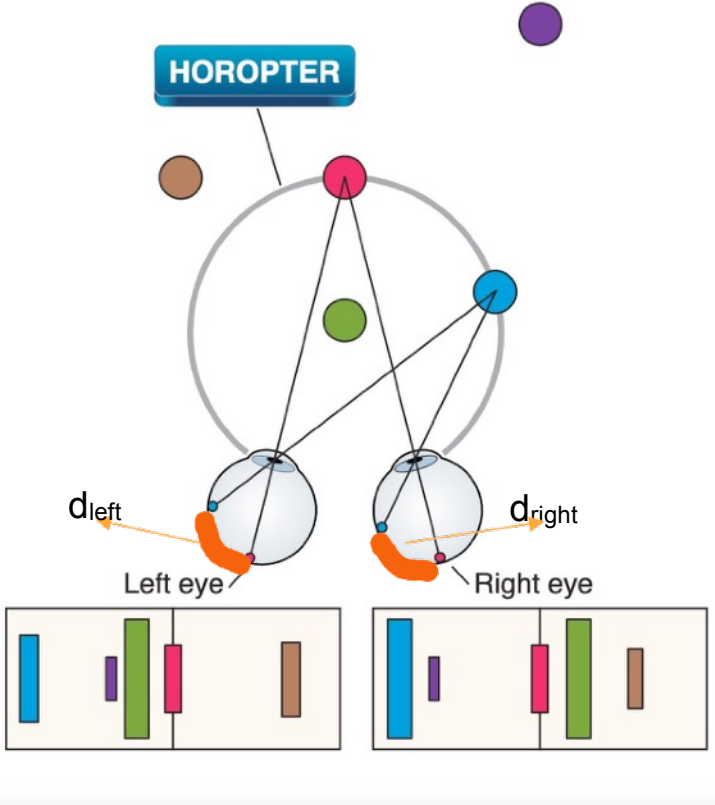


(i) Aerial perspective

(j) Familiar size

Review

Binocular disparity



Corresponding retinal points: an object falls on corresponding retinal points if the monocular retinal images of the object are formed at the same distance from the fovea in both eyes.

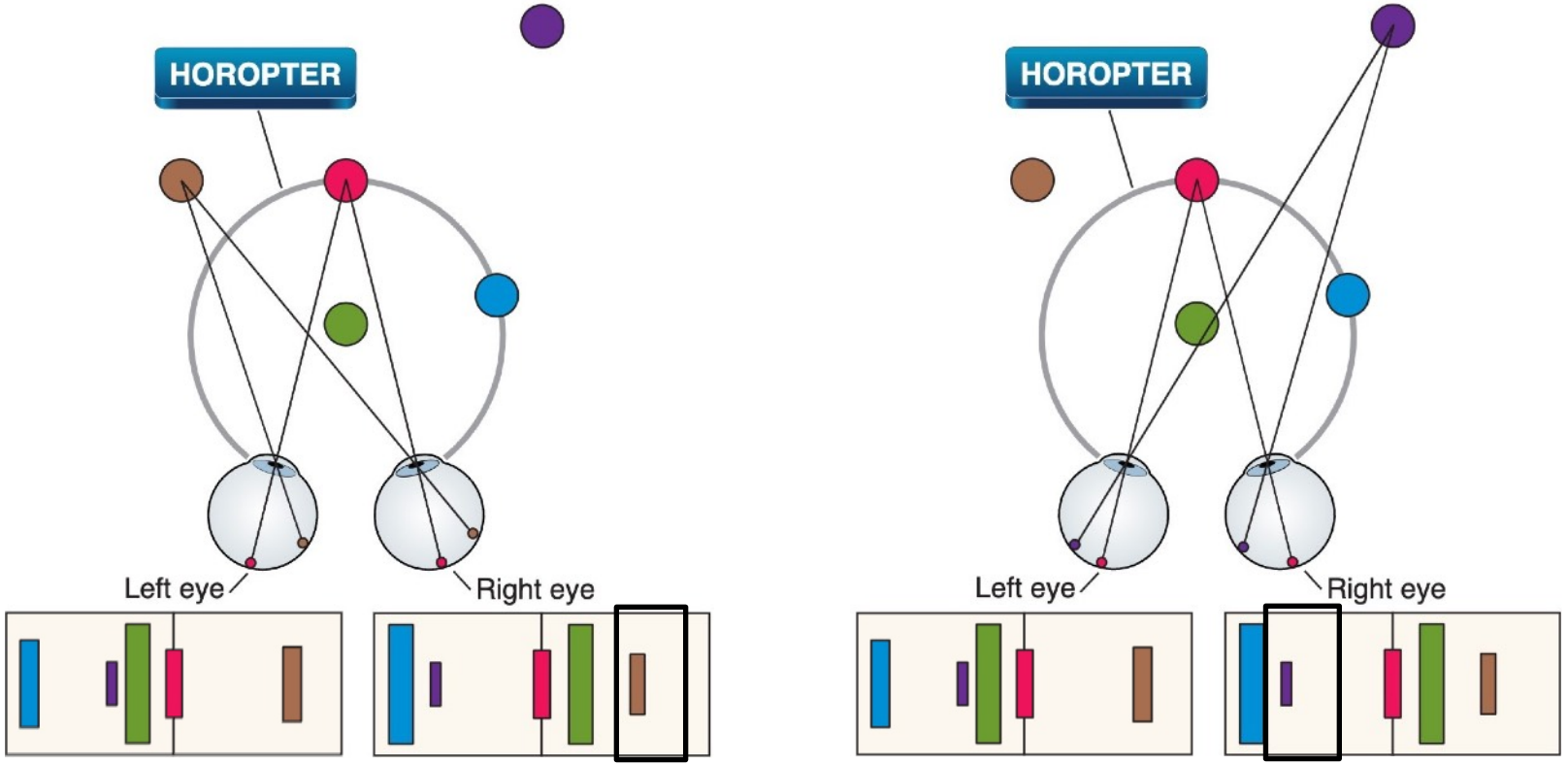
Horopter: any object placed on the horopter forms images on corresponding retinal points.

Binocular disparity: differences between the images falling on our two retinas

(d_{right} - d_{left}).

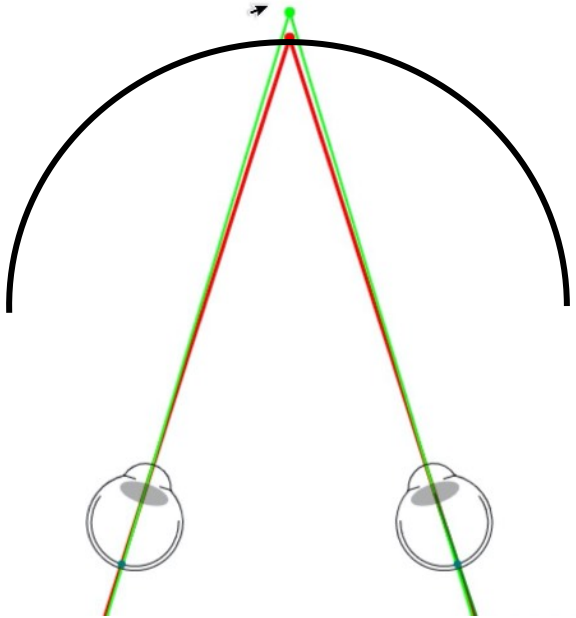
Review

Binocular disparity



Review

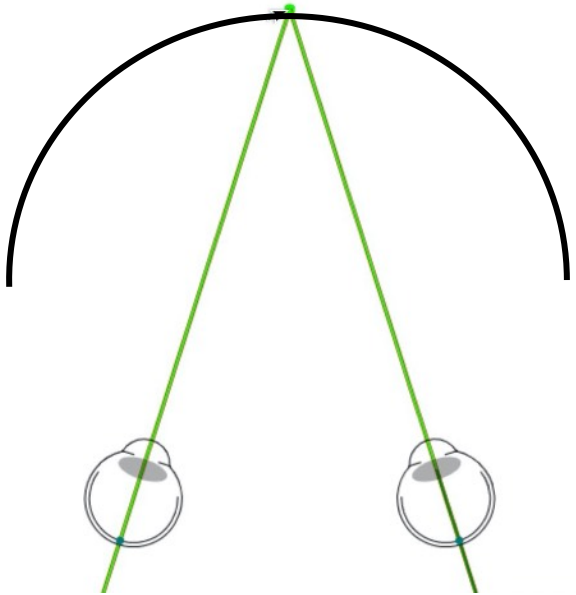
Binocular disparity



https://isle.hanover.edu/Ch07DepthSize/Ch07BinocDisp.html

Review

Binocular disparity



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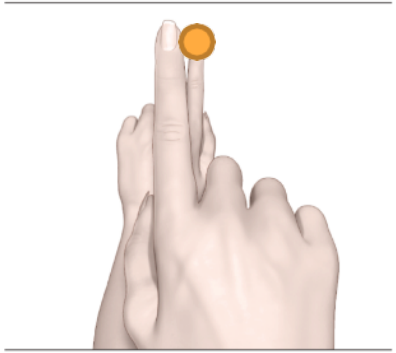
Review

Binocular disparity

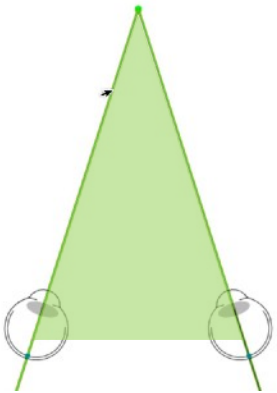
Right eye view



Left eye view

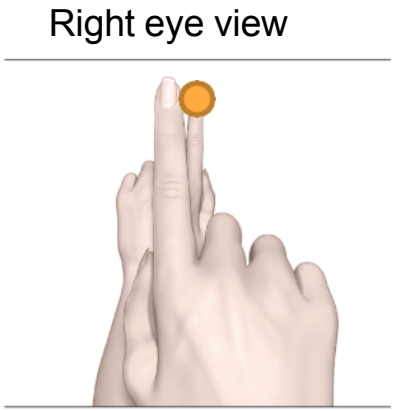
Crossed disparity: viewed from the left eye, the right finger is to the right; viewed from the right eye, the right finger is to the left.

Diplopia: double vision



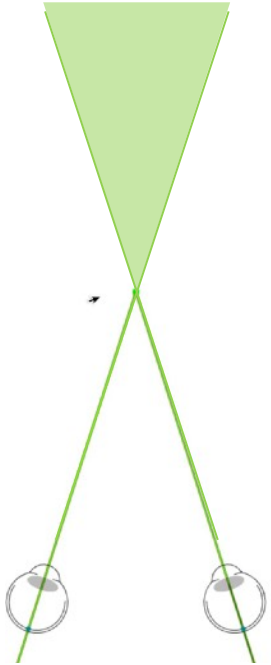
Review

Binocular disparity



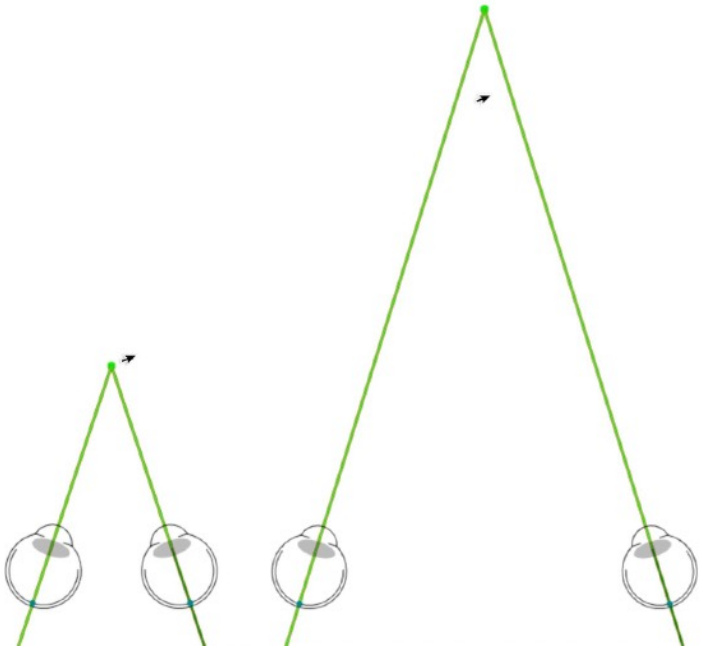
Uncrossed disparity: viewed from the left eye, the object is to the left; viewed from the right eye, the object is to the right.

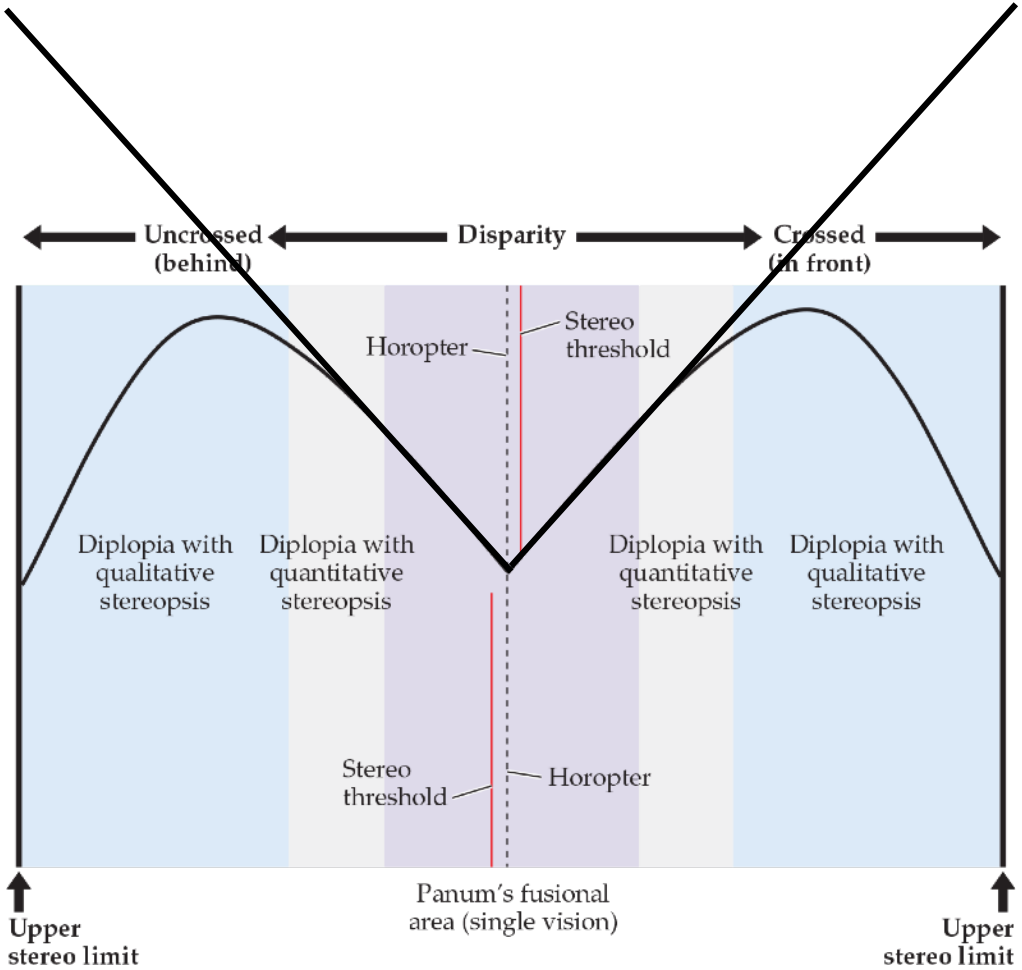
Diplopia: double vision



Review

Stereopsis





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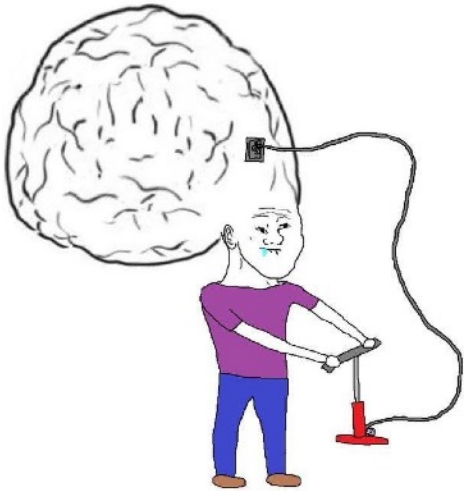
Why do we need attention?



What is attention?

Overt attention involves looking directly at the attended object.

Covert attention is attention without direct looking.

What is attention?

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Covert attention is attention without direct looking.

- Endogenous: voluntary allocation of attention to a spatial location; goal driven
- Exogenous: automatically drawing your attention to a spatial location; involuntary, stimulus driven


R=1


R=1

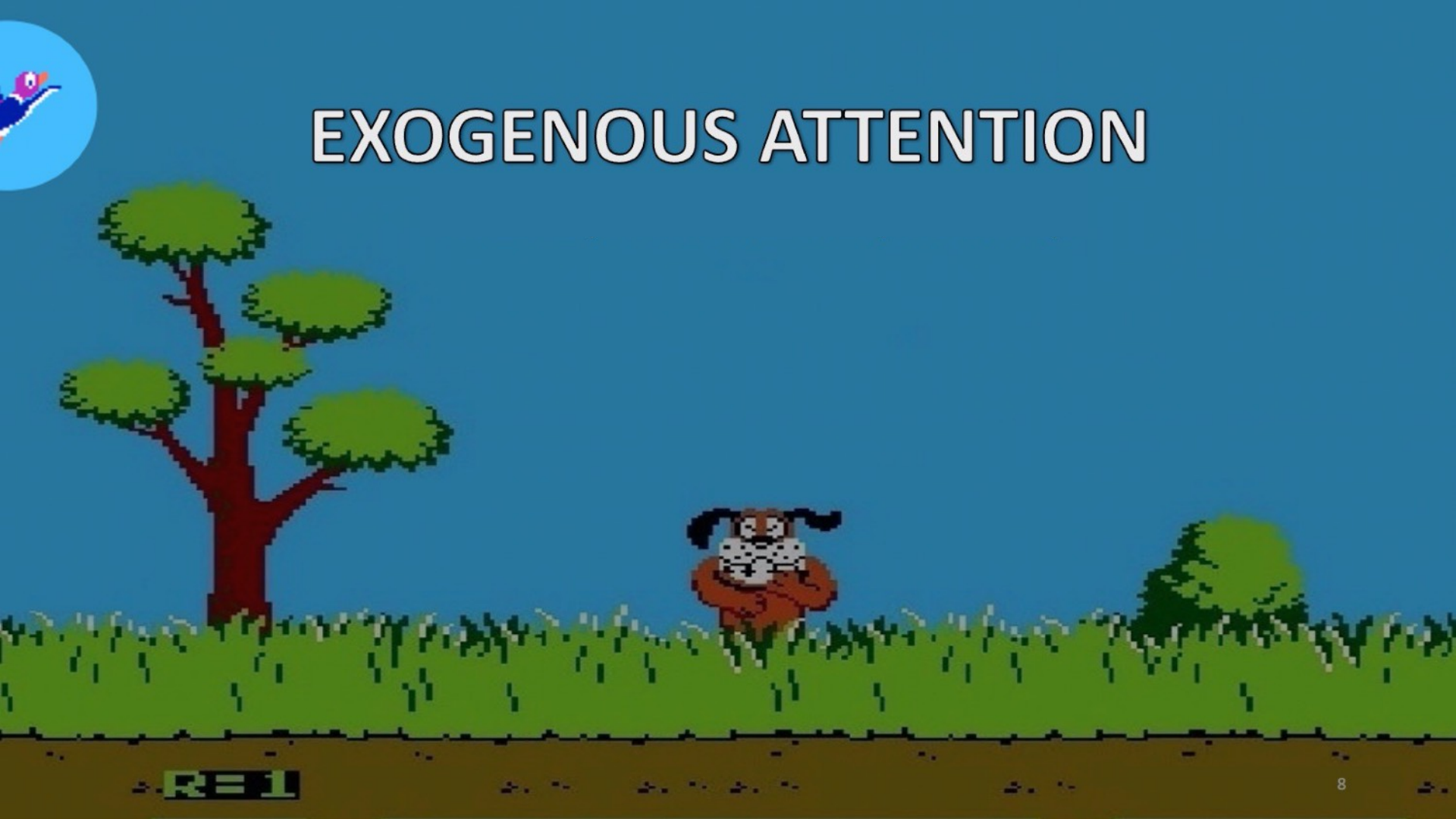

R=1


R=1

ENDOGENOUS ATTENTION


R=1

EXOGENOUS ATTENTION



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- Endogenous: voluntary allocation of attention to a spatial location; goal driven
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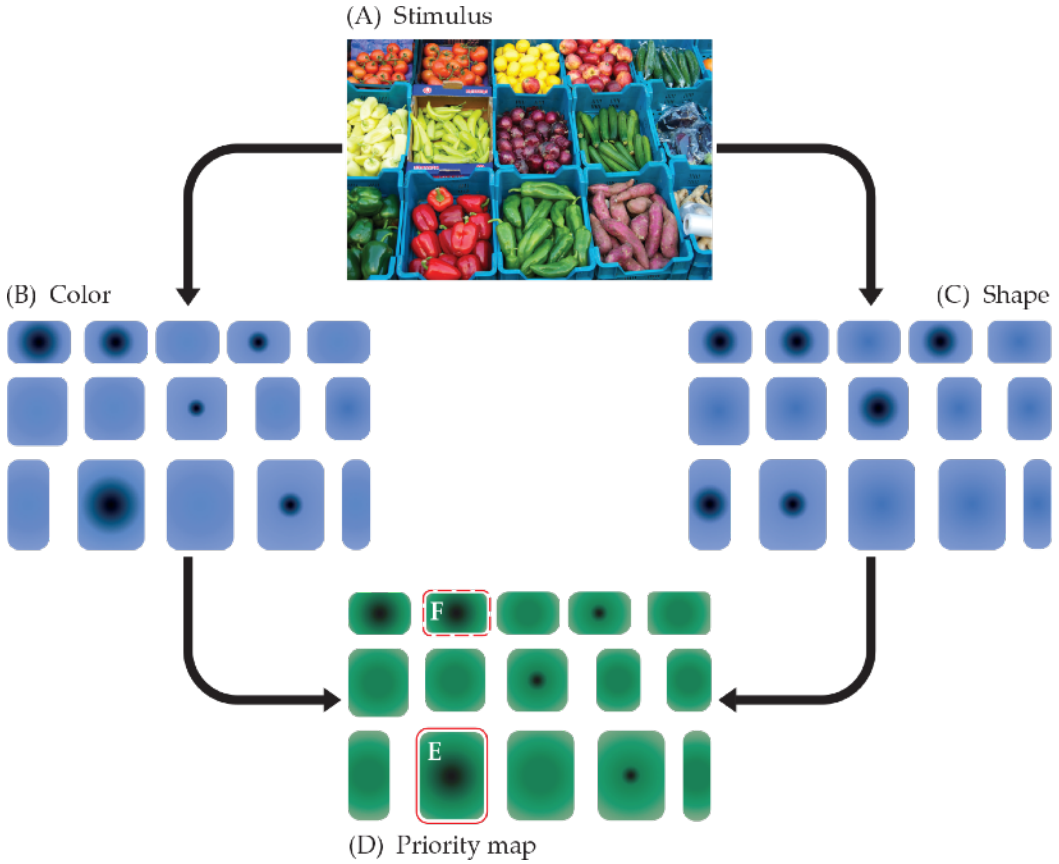
Feature-based attention is a process by which a specific stimulus feature receives enhanced processing.

What is attention?

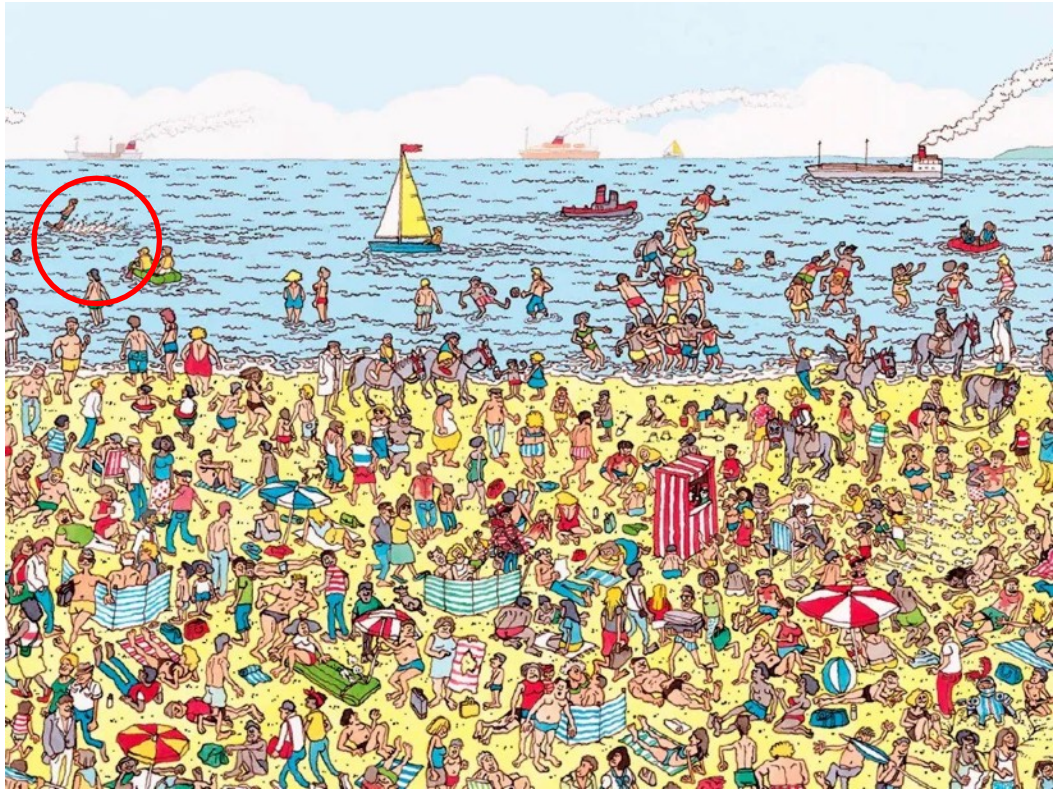
Feature-based attention



What is attention?

Exercise 1

Where's Waldo



What is attention?

Exercise 2

What is attention?

Exercise 3

What is attention?

Exercise 4

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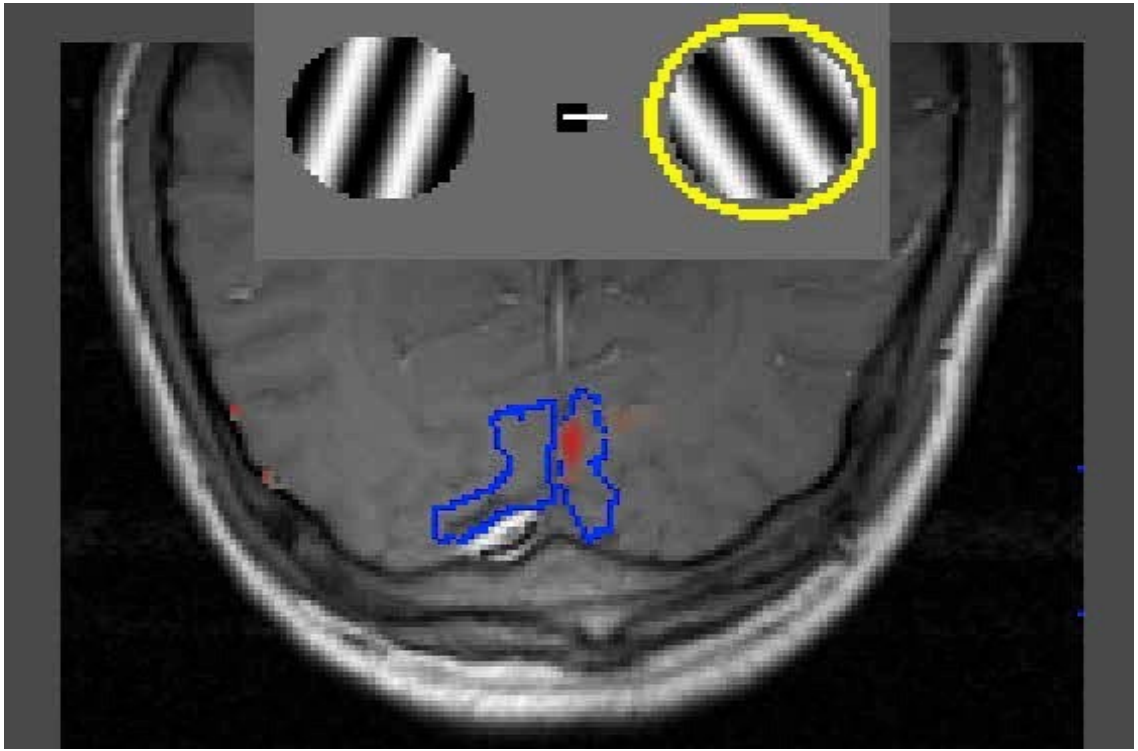
The physiological basis of attention

Enhancement of neural activity



The physiological basis of attention

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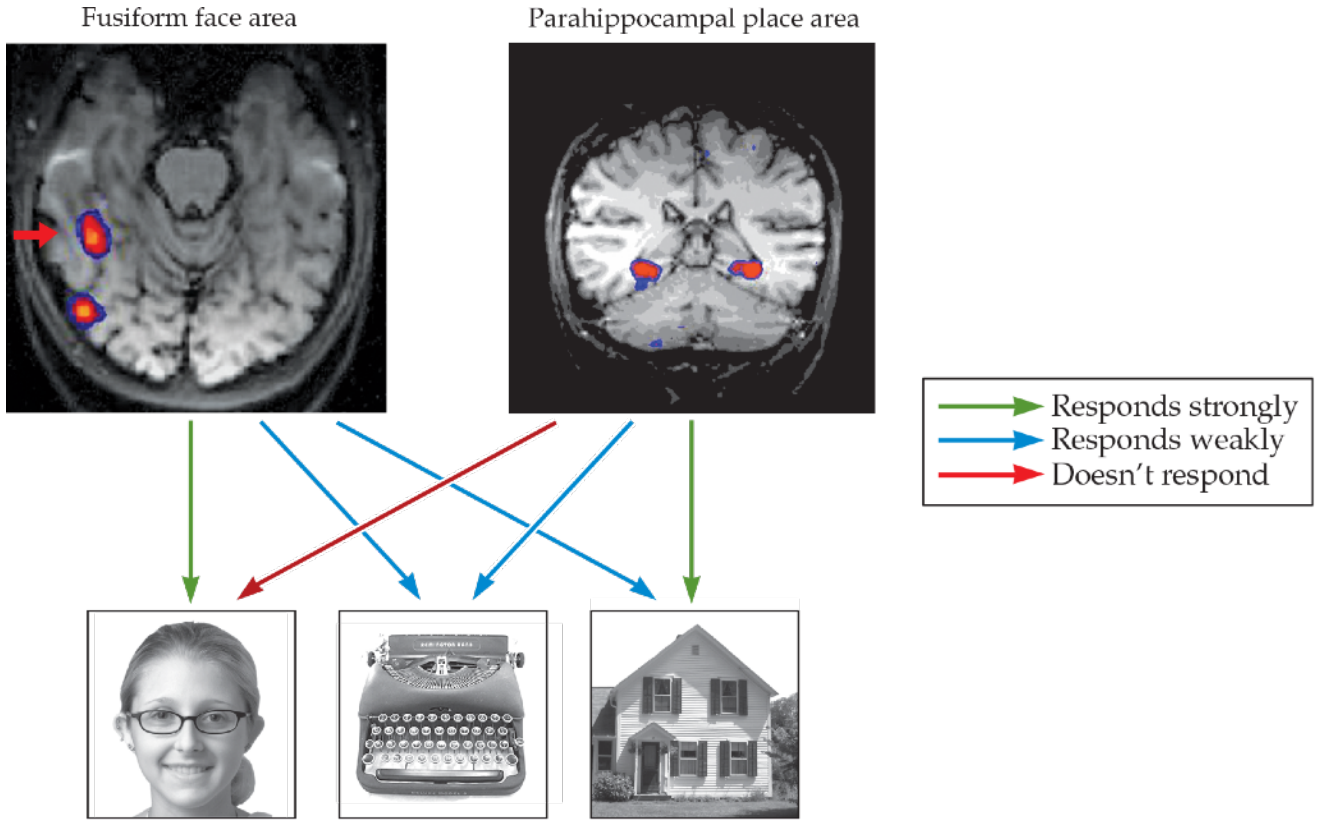
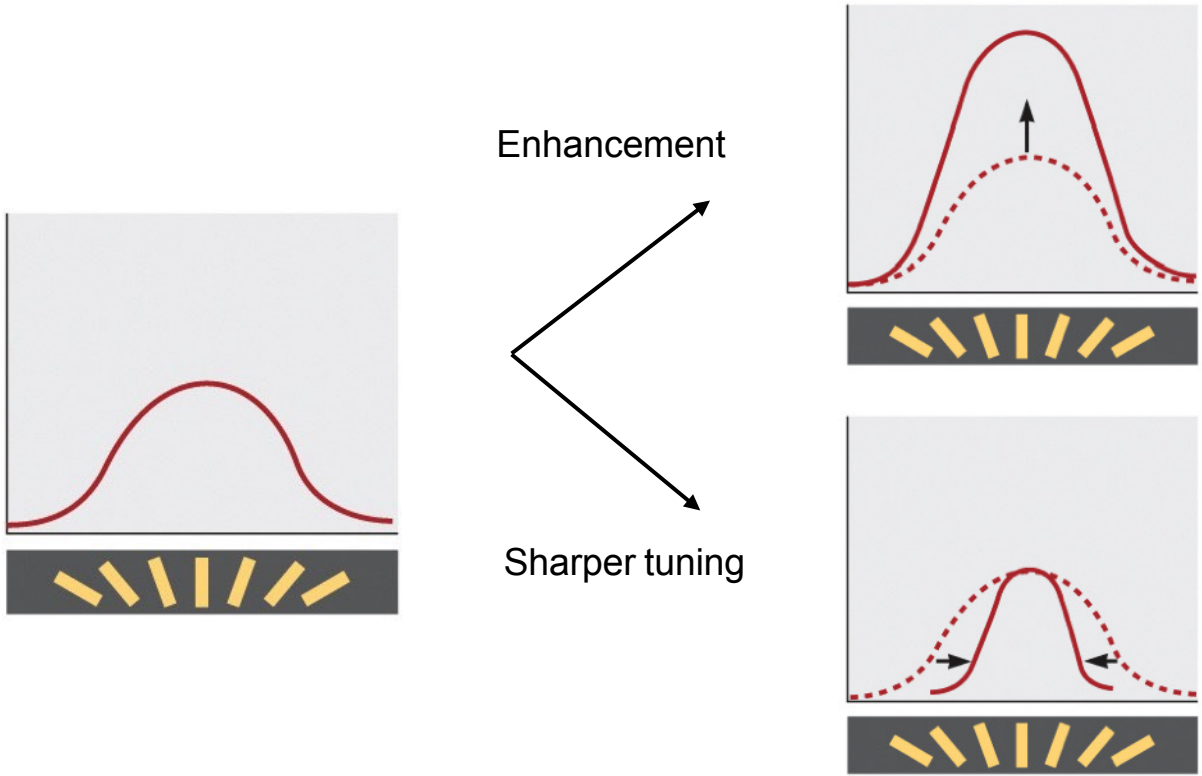


The physiological basis of attention

Enhancement of neural activity

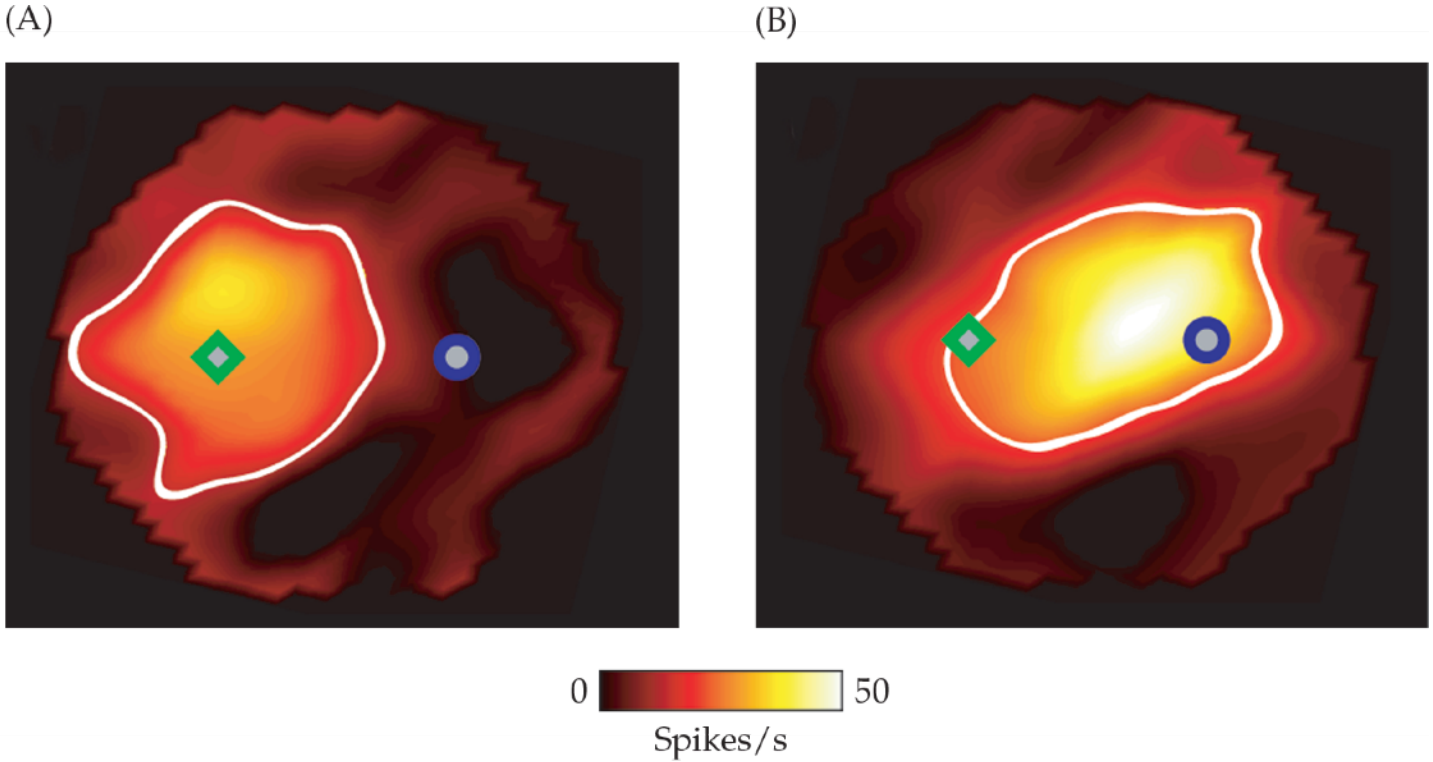
The physiological basis of attention

Attention and single cells



The physiological basis of attention

Attention and single cells



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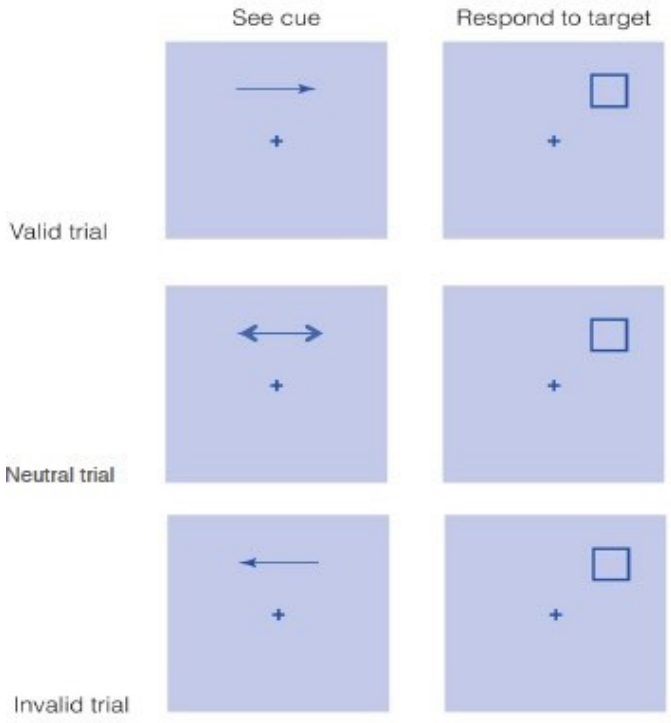
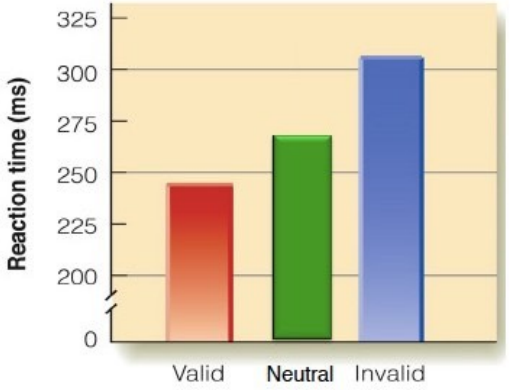
What Are Benefits of Attention?

Attention-speed responding



Posner and coworkers (1978)



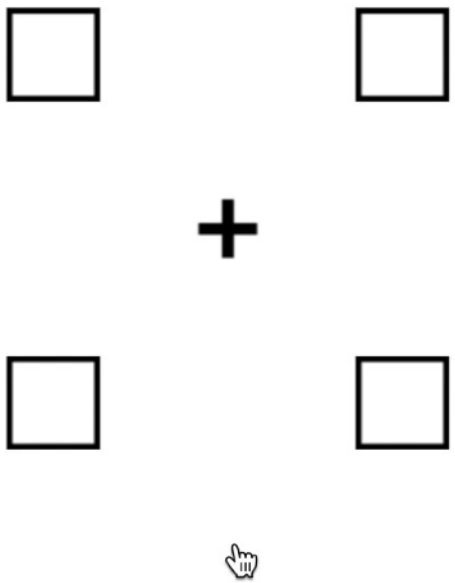
Procedure: subjects were asked to fixate at the cross, and then there was a pre-cue flashed on the screen indicating on which side the target stimulus was likely to appear. The task was to press a key as rapidly as possible when the target stimulus was presented.

Results: subjects reacted more rapidly on valid trials than neutral trials than invalid trials.

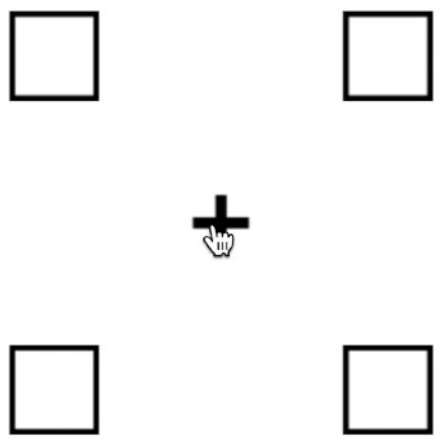
What Are Benefits of Attention?

Attention-speed responding

Endogenous



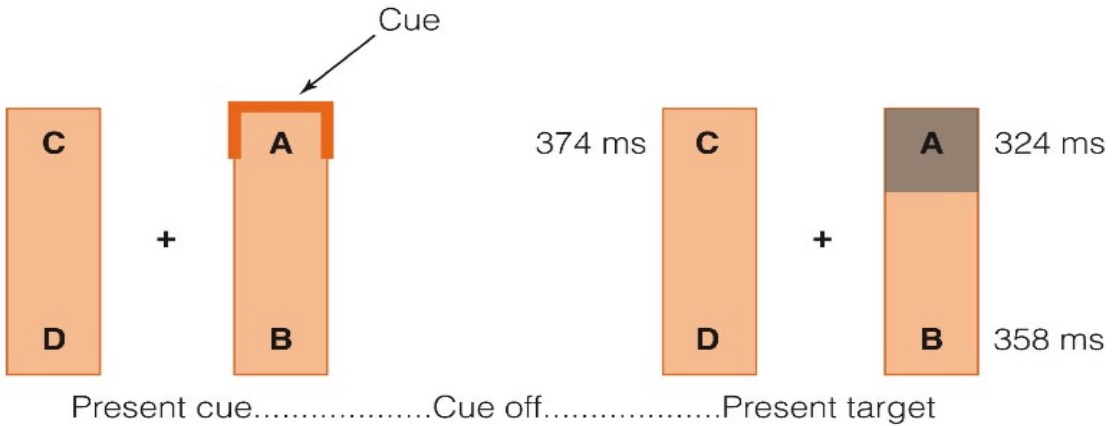
Exogenous



What Are Benefits of Attention?

Attention-speed responding

Egley and coworkers (1994)



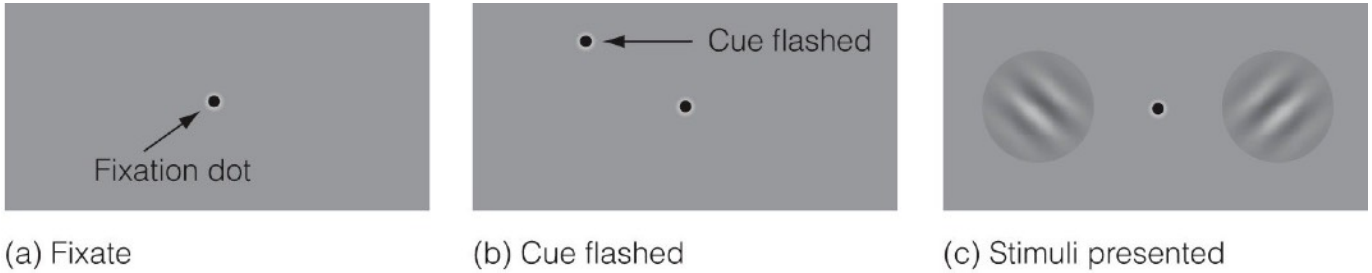
Procedure: subjects were asked to fixate at the cross, and then there was a pre-cue flashed on the screen indicating on where a target, a dark square, would probably appear. The subjects' task was to press a button when the target was presented anywhere on the display.

Results: subjects reacted more rapidly when the target was presented at the cued location A. More interestingly, subjects responded more rapidly when the target was presented at location B than C. The faster responding that occurs when enhancement spreads within an object is called the same-object advantage.

What Are Benefits of Attention?

Attention can influence appearance

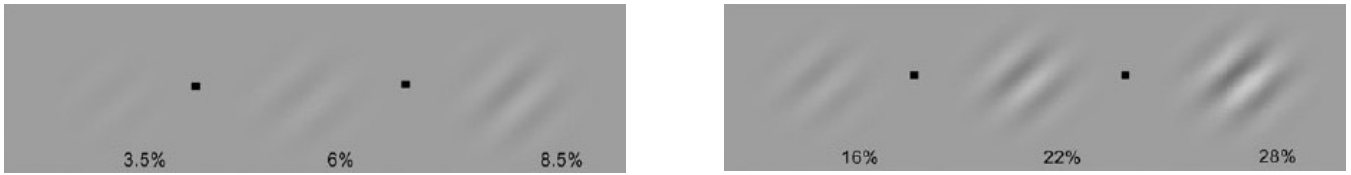
Carrasco and coworkers (2004)



(a) Fixate (b) Cue flashed (c) Stimuli presented

Procedure: subjects were asked to fixate at the dot and a pre-cue was briefly flashed. The task was to indicate the orientation of the grating with higher contrast.

Results: When there was a large difference in contrast, the pre-cue had no effect. When the contrast was the same, observers were more likely to report that the orientation of the one that the pre-cue indicated.



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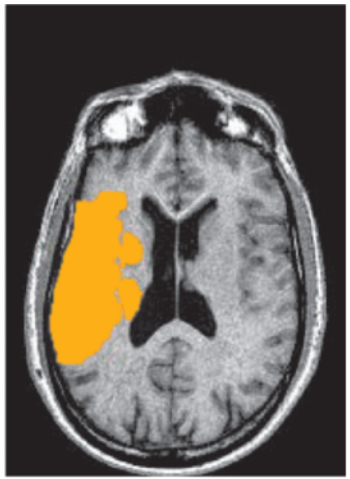
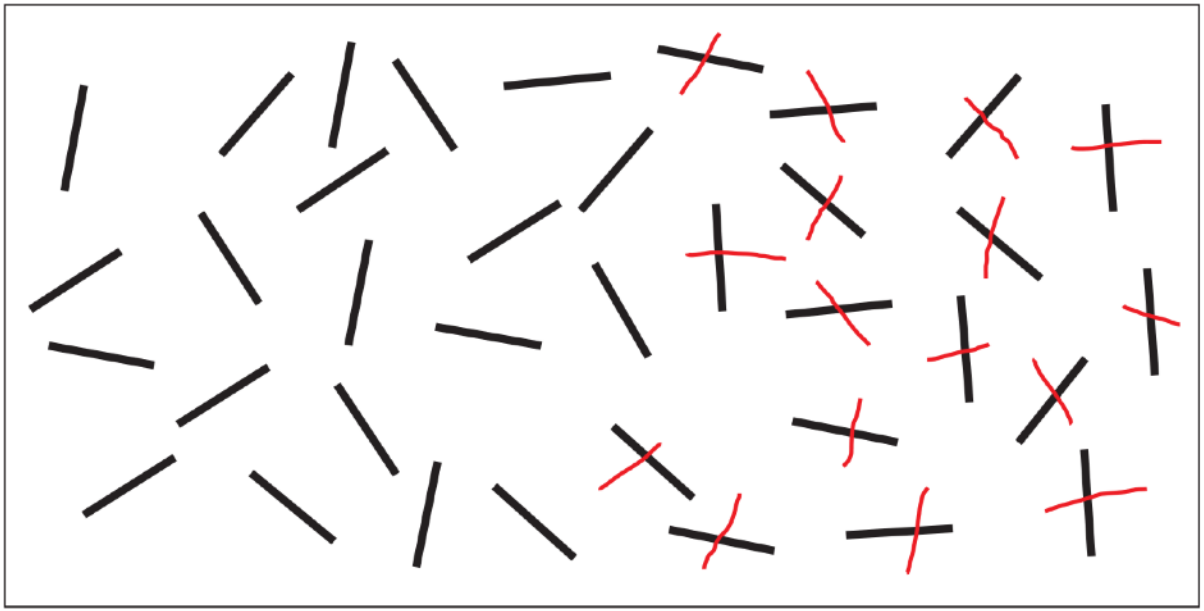
What happens when we can’t/don’t attend?

Attentional neglect



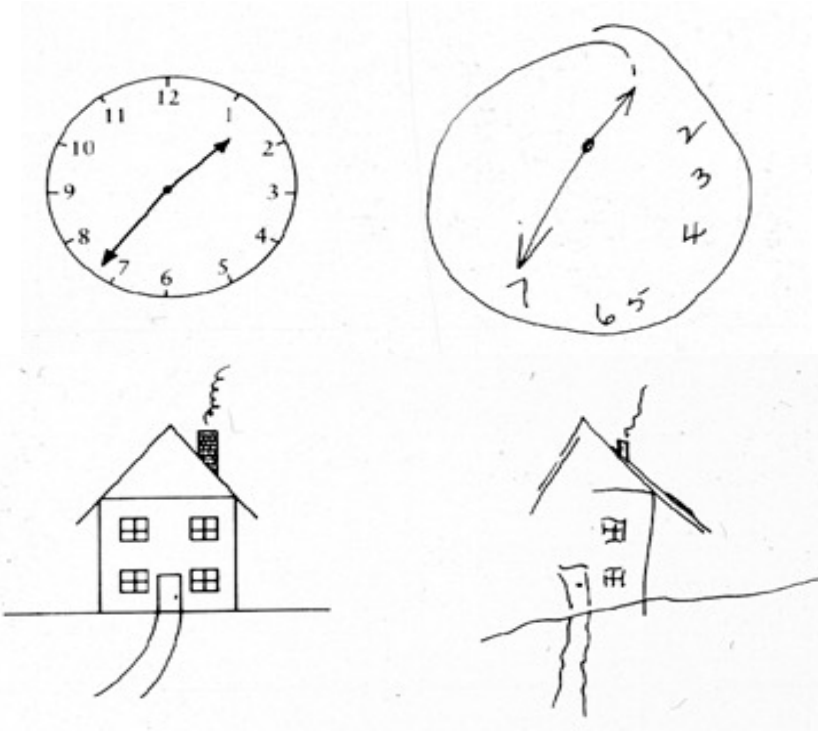
Patients with neglect behave as if part of the world were not there.

The cancellation task



What happens when we can’t/don’t attend?

Attentional neglect



The object copying task

What happens when we can’t/don’t attend?

Attentional neglect

What happens when we can’t/don’t attend?

Inattentional blindness

Inattentional blindness refers to a phenomenon that a stimulus that is not attended is not perceived, even though we are looking directly at it.

https://www.youtube.com/watch?v=f94o3B3csYI

What happens when we can’t/don’t attend?

Inattentional blindness

https://www.youtube.com/watch?v=b7LuvAM6XLg

What happens when we can’t/don’t attend?

Inattentional blindness

https://www.youtube.com/watch?v=vBPG_OBgTWg

What happens when we can’t/don’t attend?

Inattentional blindness

Inattentional blindness refers to a phenomenon that a stimulus that is not attended is not perceived, even though we are looking directly at it.

Procedure: subjects were presented the cross stimulus for 5 trials and asked to indicate which bar was longer, the horizontal or the vertical. On the sixth trial, a small outline of a square was added to the display and subjects were asked whether they noticed it immediately after the trial.

Results: most subjects (18/20) were “blind” to the small square.

What happens when we can’t/don’t attend?

Change blindness

Change blindness refers to a phenomenon that occurs when a stimulus undergoes a change without this being noticed by observers.

What happens when we can’t/don’t attend?

Change blindness

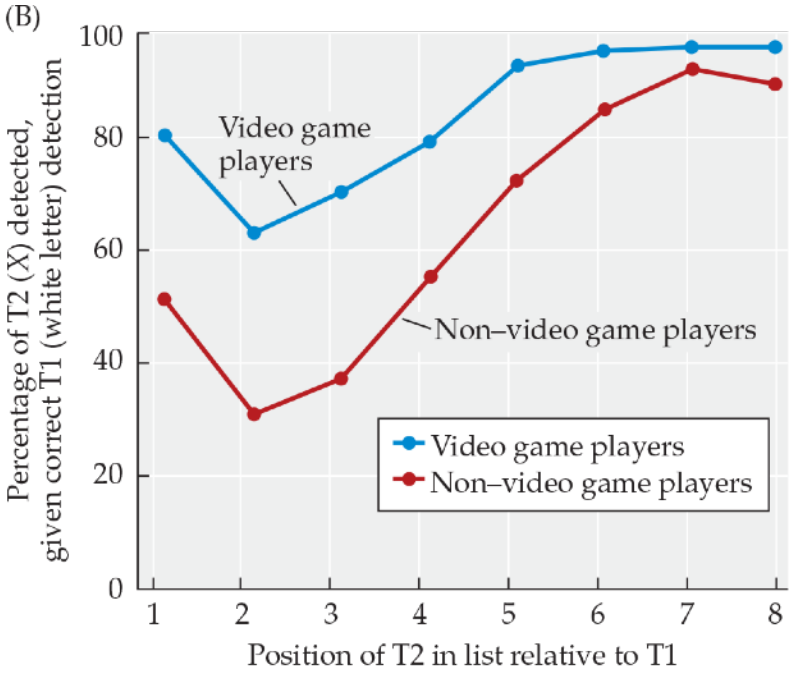
What happens when we can’t/don’t attend?

Change blindness

What happens when we can’t/don’t attend?

Attentional blink

Attentional blink refers the tendency not to perceive or respond to the second of two different target stimuli amid a rapid stream of distracting stimuli.



Time for in-class study questions!