

Biology 70, Lecture 4, Part I

Fall 2007

Biology 70 Part II Sensory Systems lecture 4

<http://www.biology.ucsc.edu/classes/bio70/>

1

color



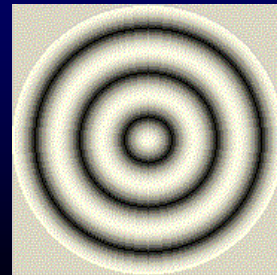
2

depth



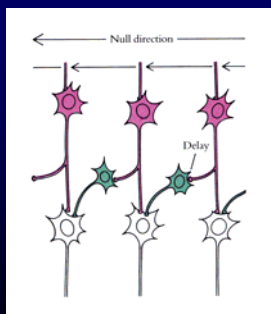
3

motion



4

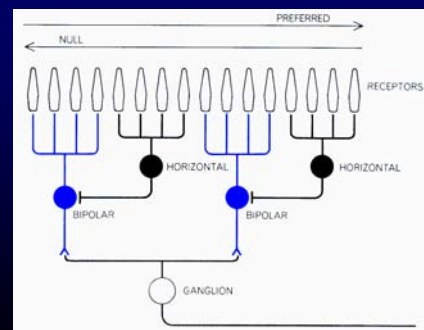
motion detector network



from: Eye, Brain, and Vision, by D. Hubel, p.19.

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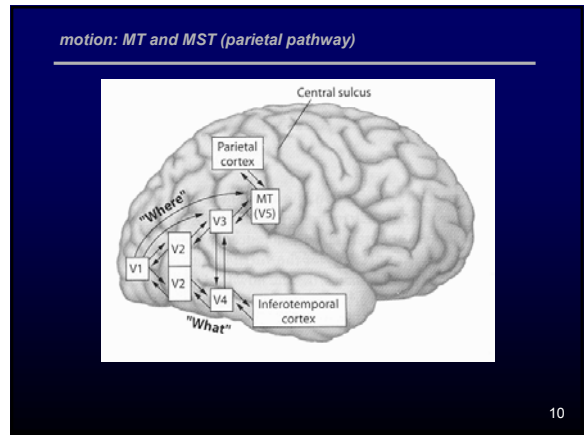
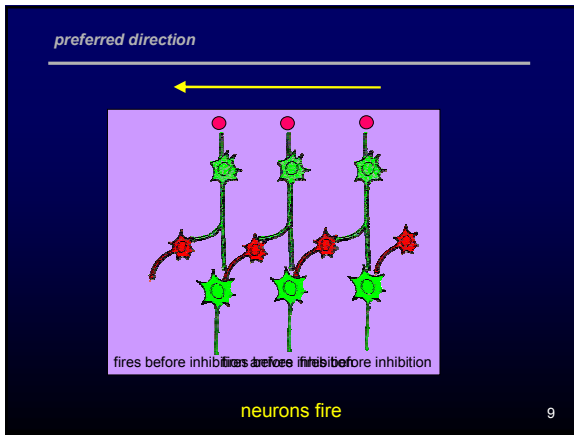
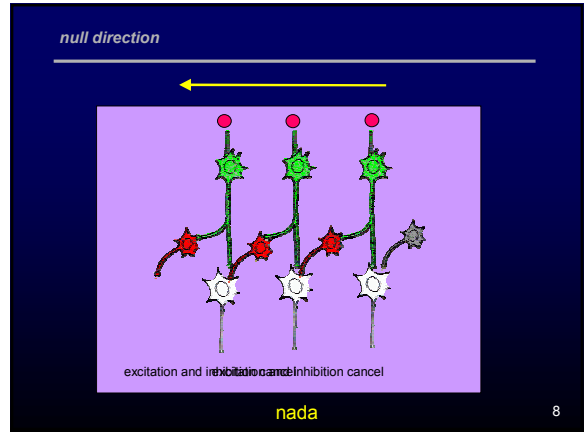
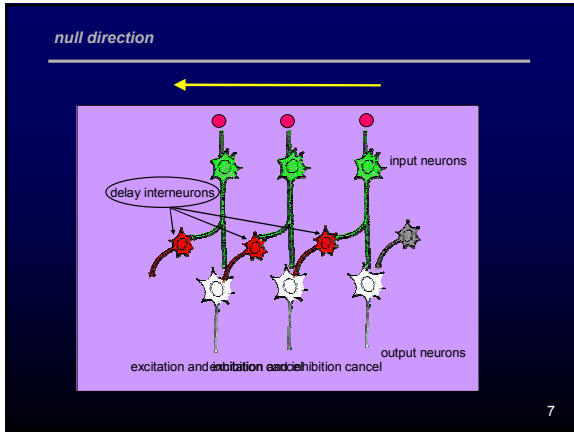
neuron selective for direction of motion



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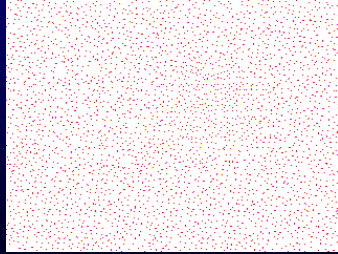
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more common fate



<http://dragon.uml.edu/psych/commfate.html> 3

from lecture outline: TEMPORAL PHENOMENA

- 1. How might the cortex signal direction of motion?
- 2. What is the explanation of the waterfall effect?
- 3. What is "common fate" in regard to detecting form from motion?
- 4. What is the flicker-fusion rate?

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from lecture outline: DEPTH

- 5. In the real world what are clues which the brain uses to determine depth?
- 6. What are Julesz patterns and what do they show about depth perception?

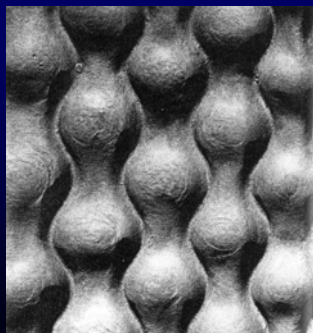
15

monocular clues : perspective, size, occlusion, and height in picture



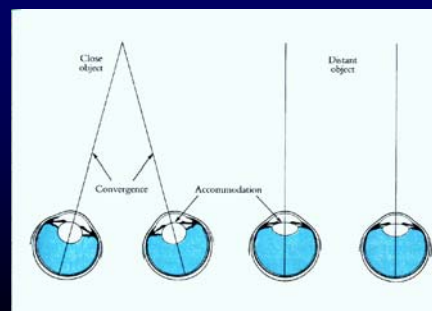
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depth, monocular clue: shadow



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depth, binocular clues: convergence and accommodation



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BAD JOKE !!



VAL AND DUNSTAN QUESTION THE MONKS OF THE SCRIPTORIUM, BUT ALL CAN ACCOUNT FOR THEMSELVES THE PREVIOUS NIGHT. AT DAY'S END, A WEARY CHIEF SCRIBE POURS OUT THE WINE -- BADLY. VAL REMEMBERS THAT SIGHT IN ONLY ONE EYE PLAYS HAVOC WITH THE SENSE OF DEPTH.

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depth, binocular clue: disparity



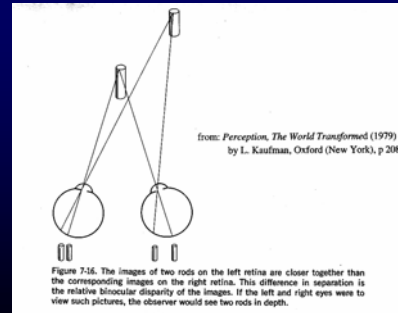
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depth, binocular clue: disparity



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disparity



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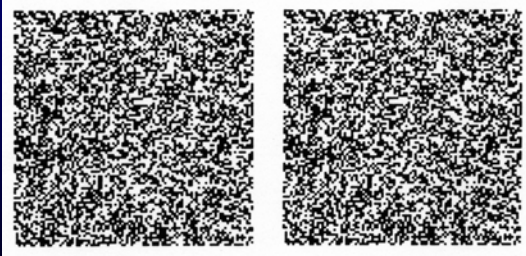
more disparity



Fig. 11.18. Binocular disparity. The square and circle are imaged quite close together on the right retina, but are imaged considerably farther apart on the left retina. If observer fixates on square, there must be a disparity in the retinal locations of the image of the circle.

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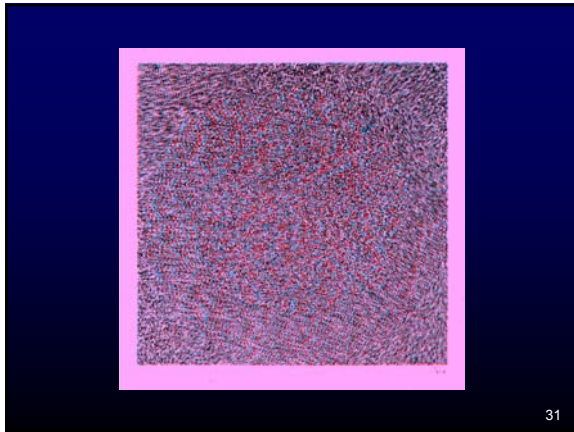
Julesz patterns: depth with disparity as only clue



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from lecture outline: DEPTH

- ▶ 5. In the real world what are clues which the brain uses to determine depth?
- ▶ 6. What are Julesz patterns and what do they show about depth perception?

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