Visual Perception

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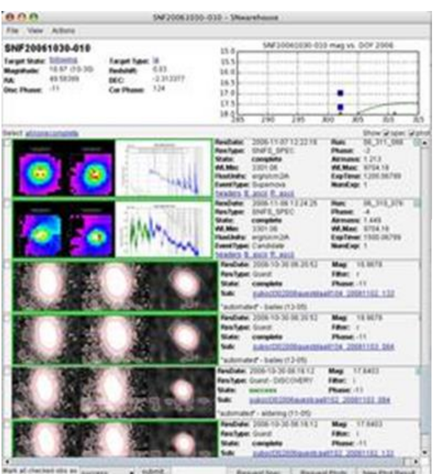
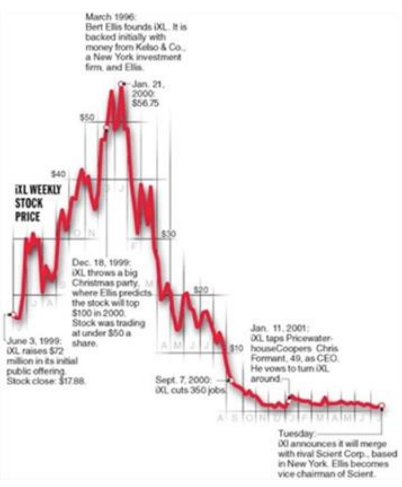




Thinking with our Eyes

- 70% of body's sense receptors reside in our eyes
- Metaphors to describe understanding often refer to vision ("I see," "insight," "illumination")
- "The eye and the visual cortex of the brain form a massively parallel processor that provides the highest-bandwidth channel into human cognitive centers." – Colin Ware, *Information Visualization*, 2004
- Important to understand how visual perception works in order to effectively design visualizations

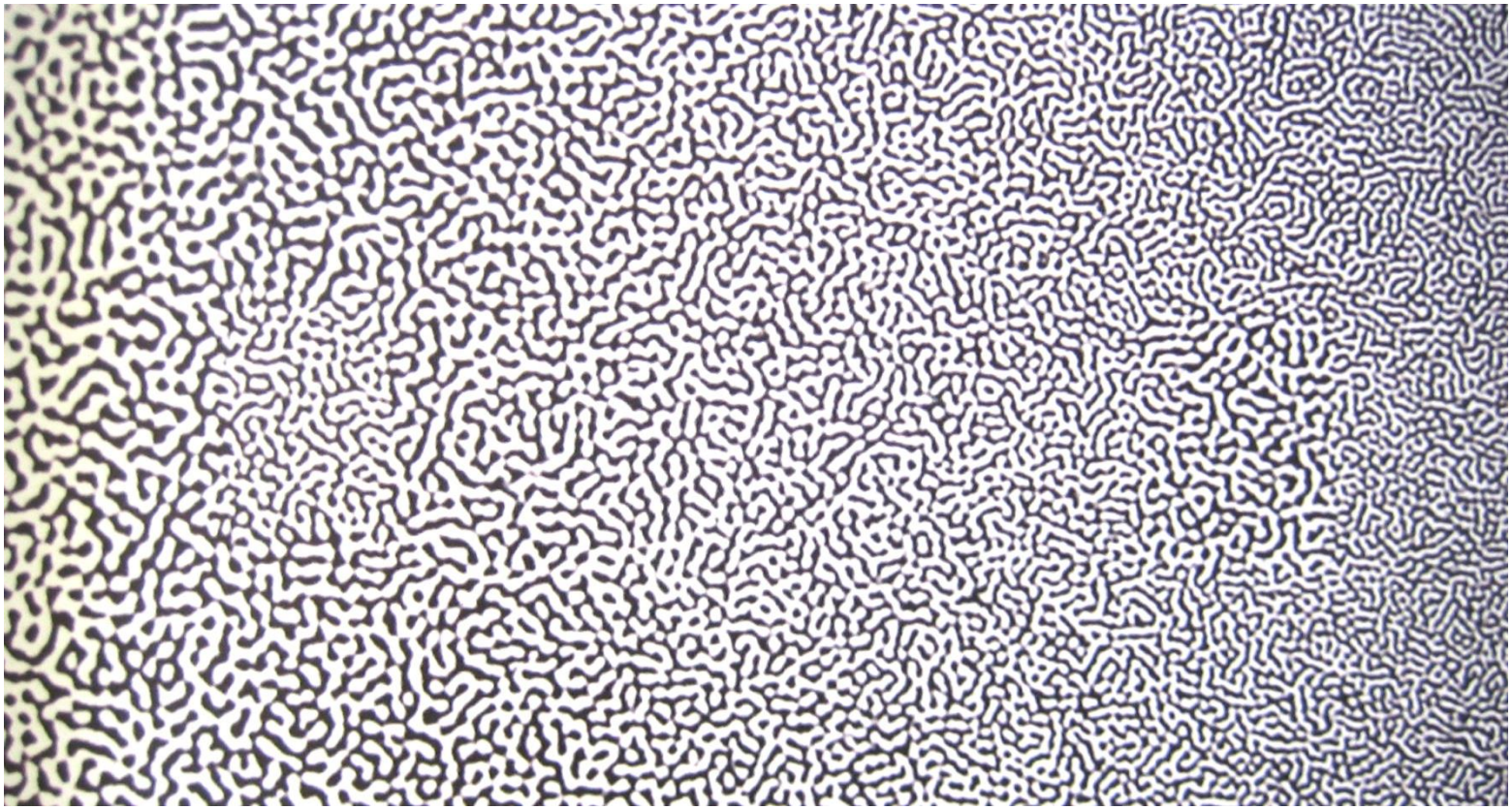
[slide adapted from Marti Hearst]

How the Eye Works

- The eye is not a camera!
- Better metaphor for vision: “dynamic and ongoing construction project” – Healey, 95
- Attention is selective (filtering)
- Cognitive processes
- Psychophysics: concerned with establishing quantitative relations between physical stimulation and perceptual events.

How to Use Perceptual Properties

- Information visualization should cause what is meaningful to stand out



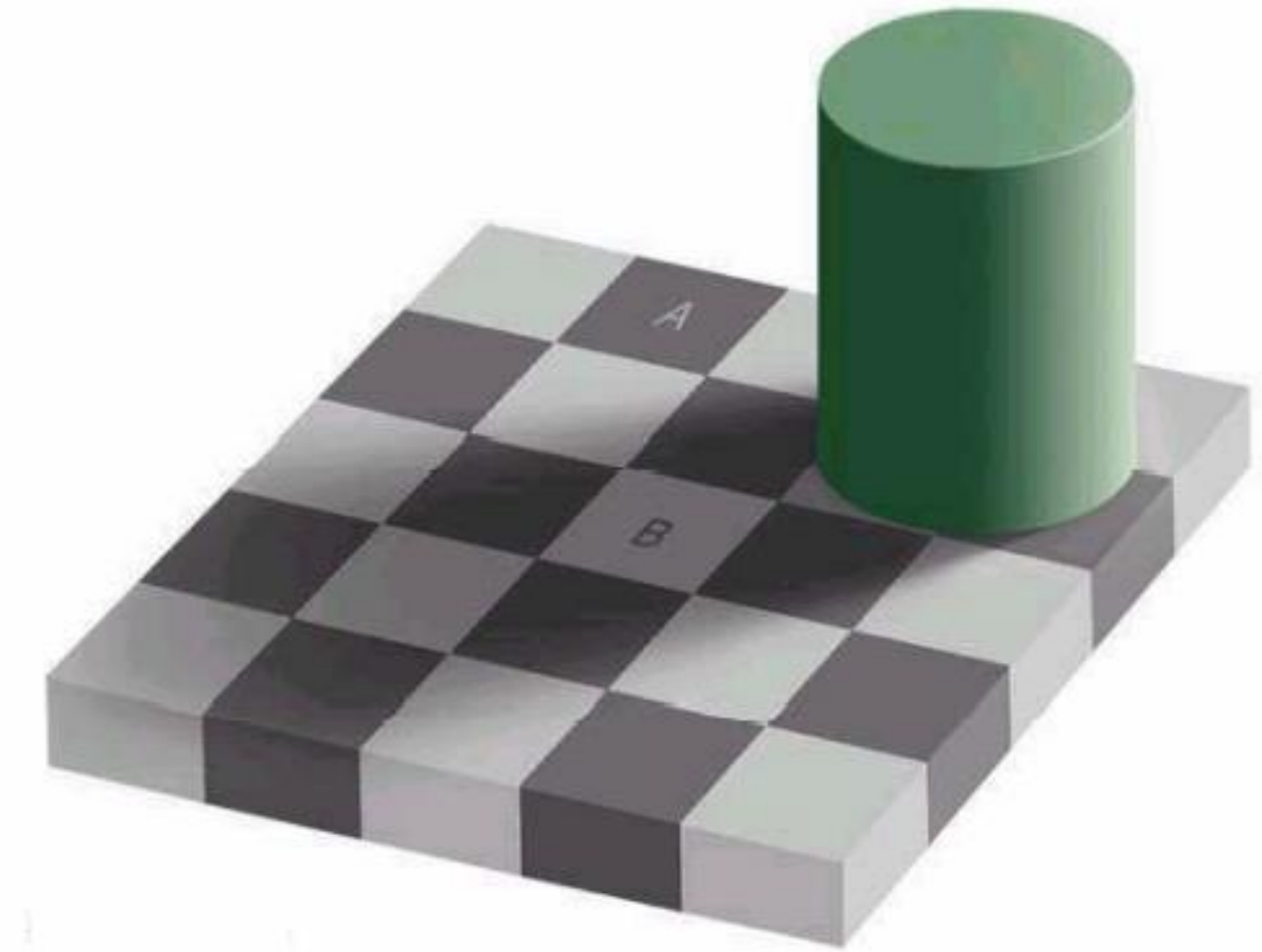
Eyes vs. Cameras

- Cameras
  - Good optics
  - Single focus, white balance, exposure
  - “Full image capture”

- Eyes
  - Relatively poor optics
  - Constantly scanning (saccades)
  - Constantly adjusting focus
  - Constantly adapting (white balance, exposure)
  - Mental reconstruction of image (sort of)

[http://www.usd.edu/psyc301/ChangeBlindness.htm]

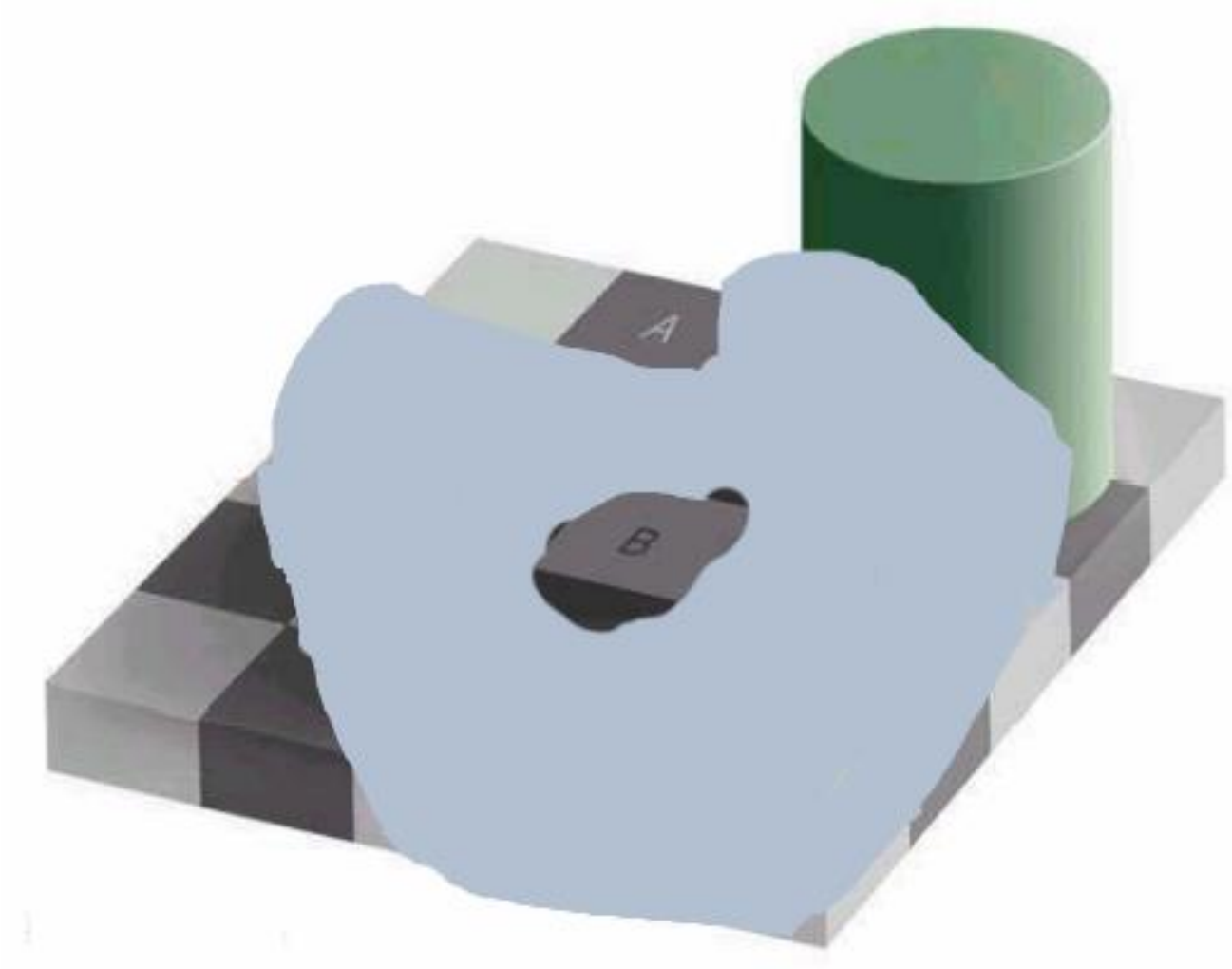
Visual perception is not just camera work



Square A is darker than B, right?

[slide from Stephen Few]

Visual perception is not just camera work



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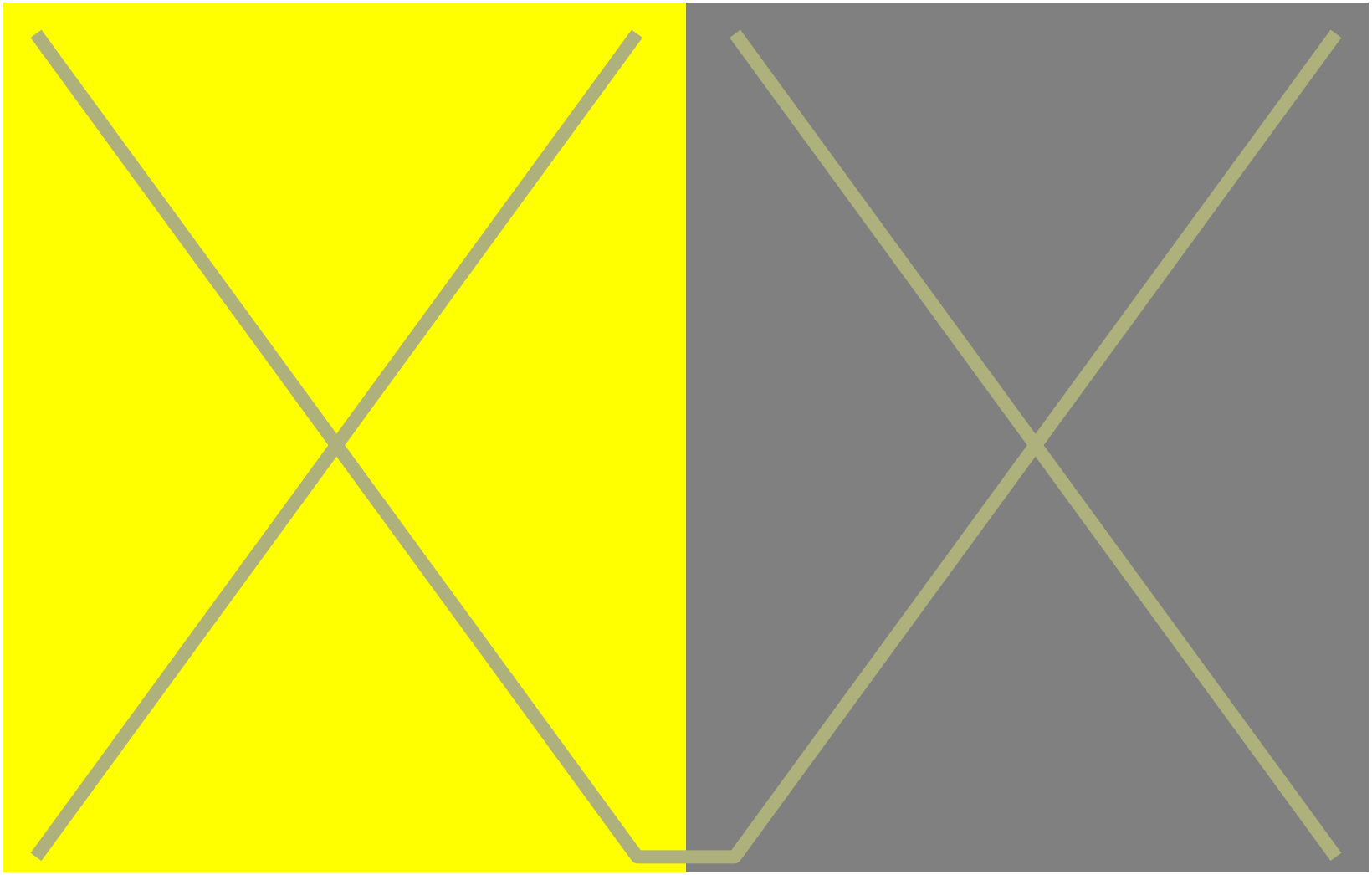
Color is relative



In conclusion

- The eye is not a camera!
- Understanding visual perception can help us develop more effective visualizations