2018-02-12 Perceptual organization

PSY 525.001 • Vision Science • 2018 Spring

Rick Gilmore

2018-02-11 13:30:16

Today's topics

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Perceptual organization

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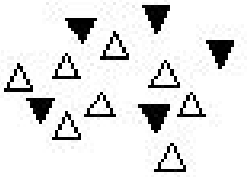
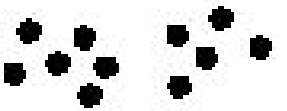
Perceptual organization

Discuss Biederman (1987).

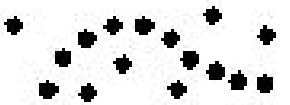
Similarity



Proximity

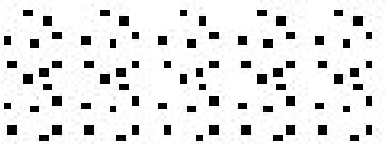


Good continuation

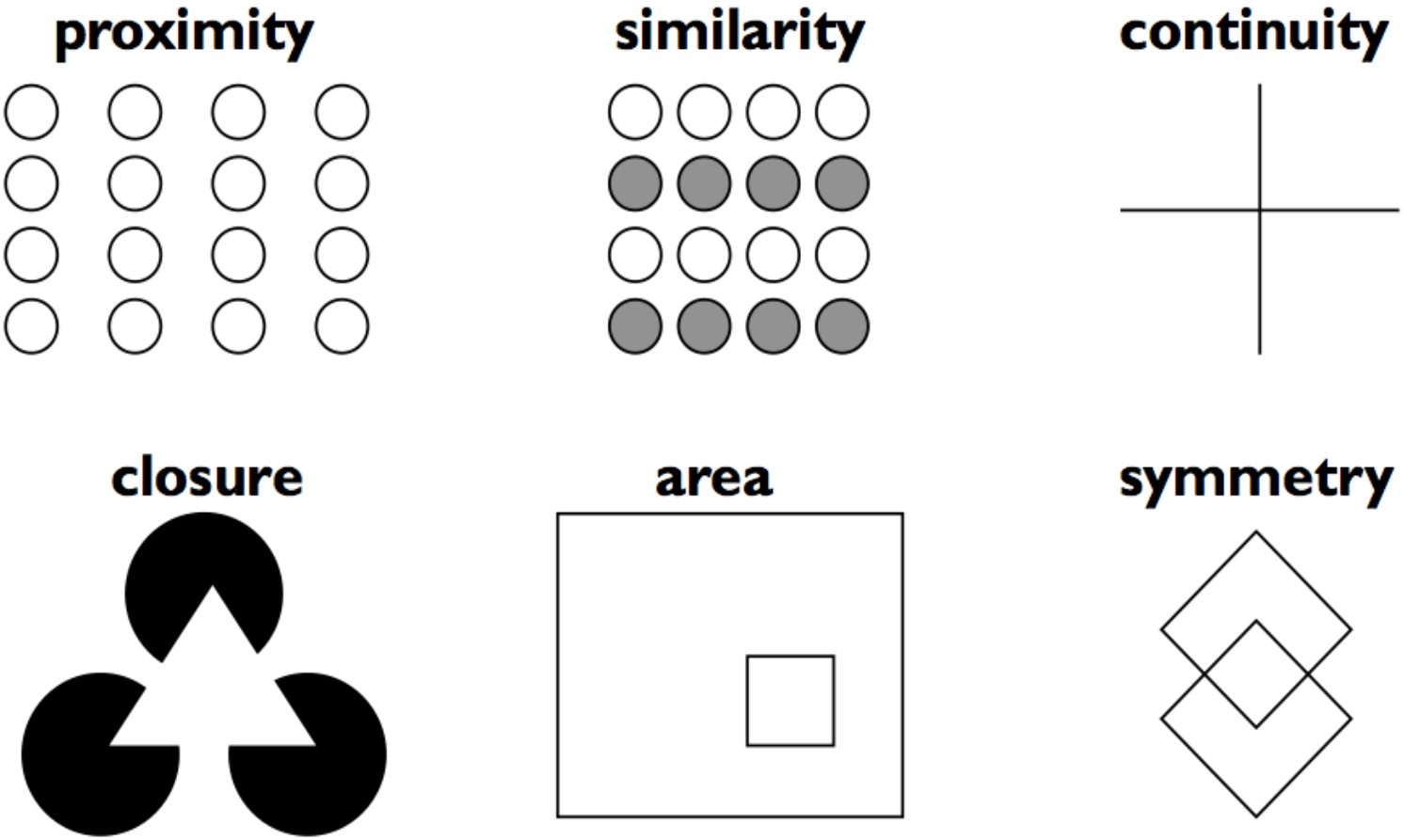


Symmetry

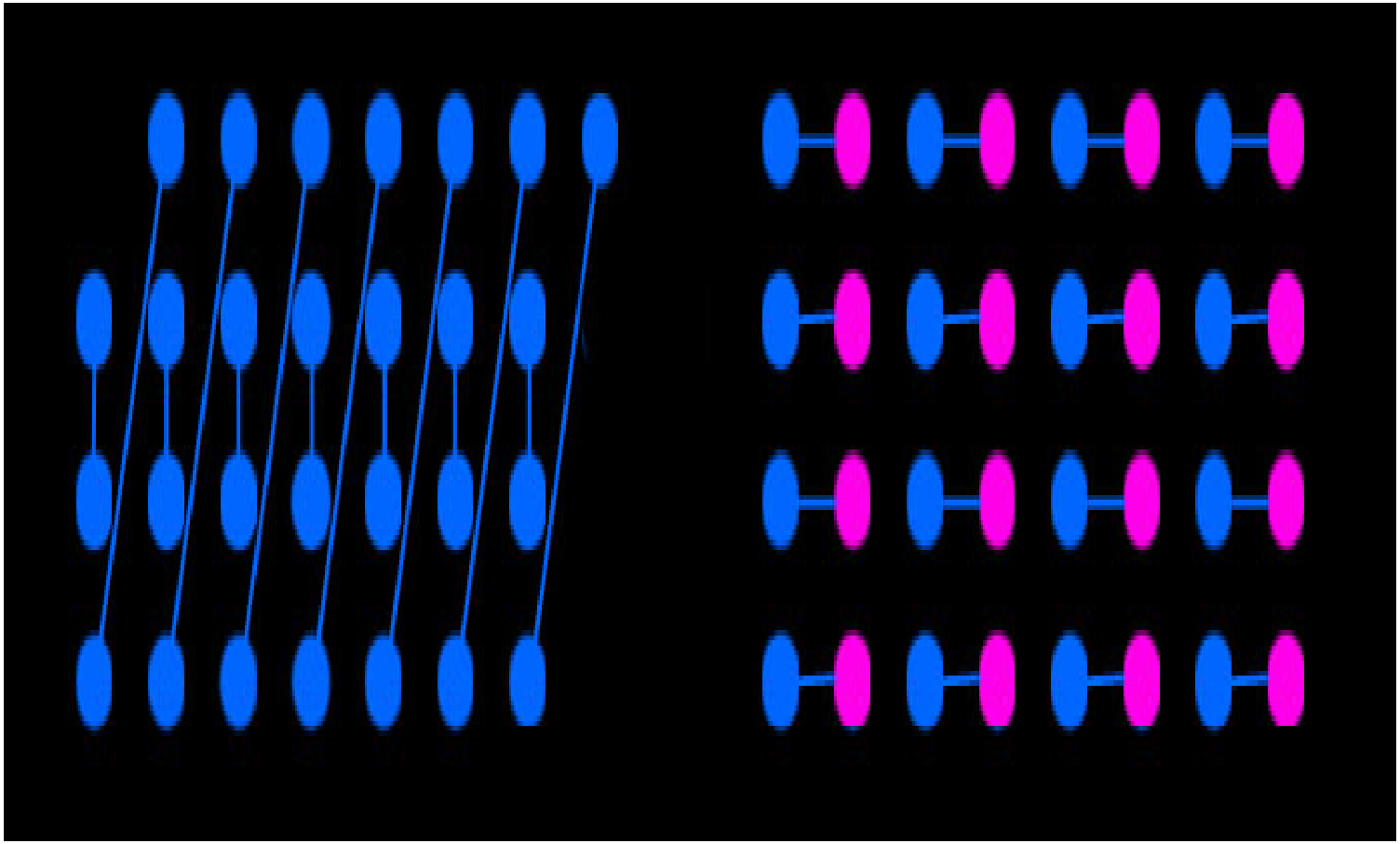
Periodicity



Perceptual grouping

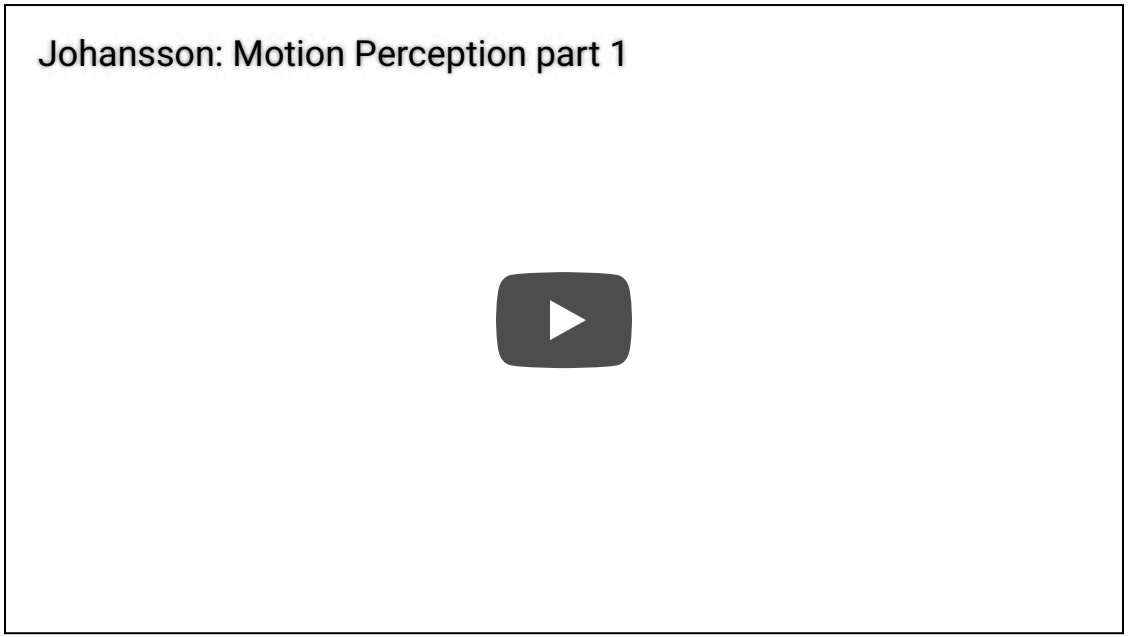


Perceptual grouping



Element connectedness

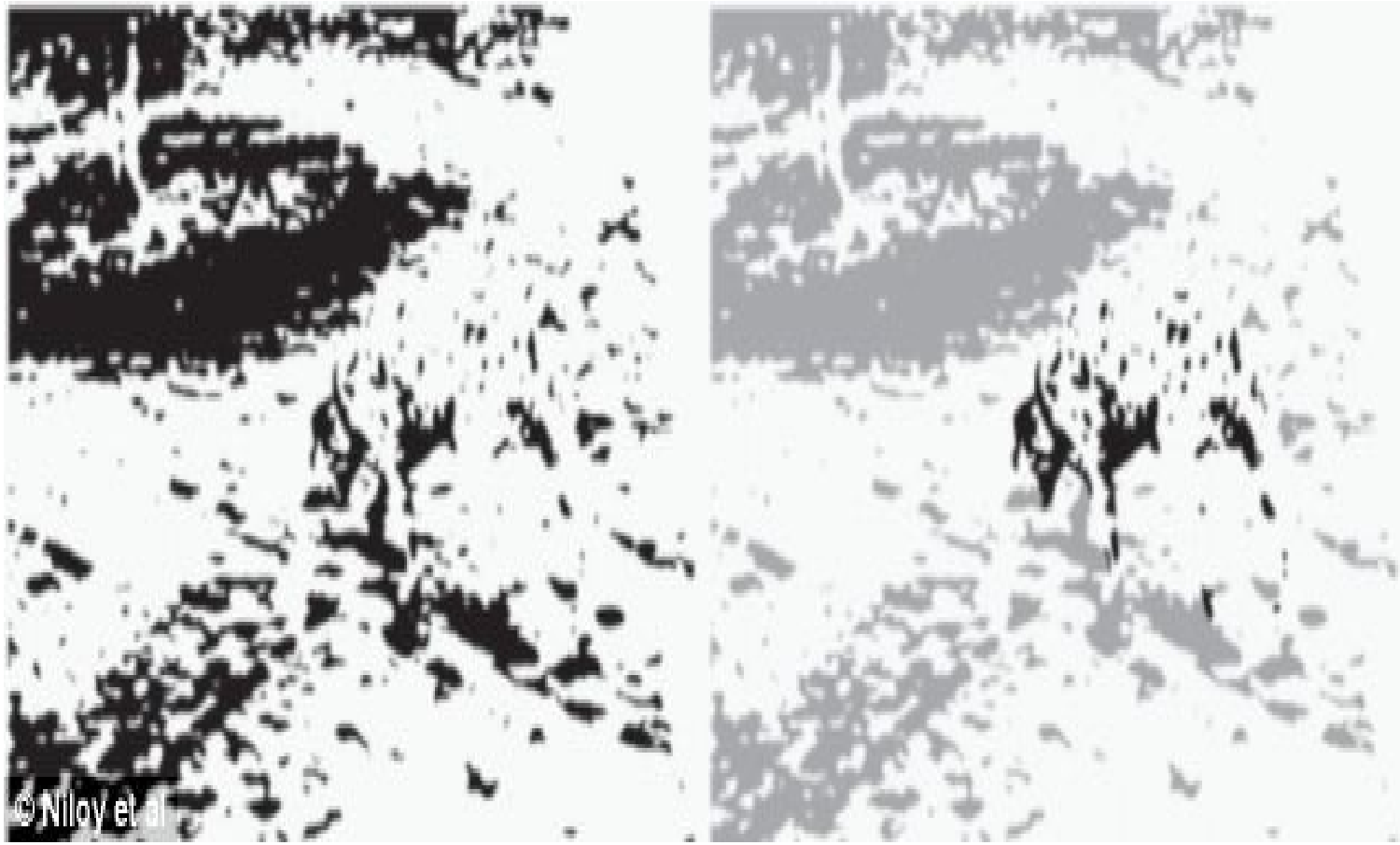
Common region



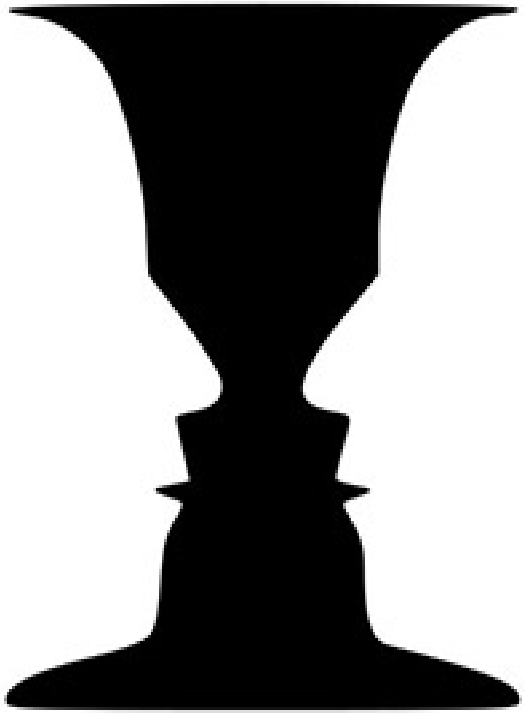
Motion and perceptual organization

Early or late?

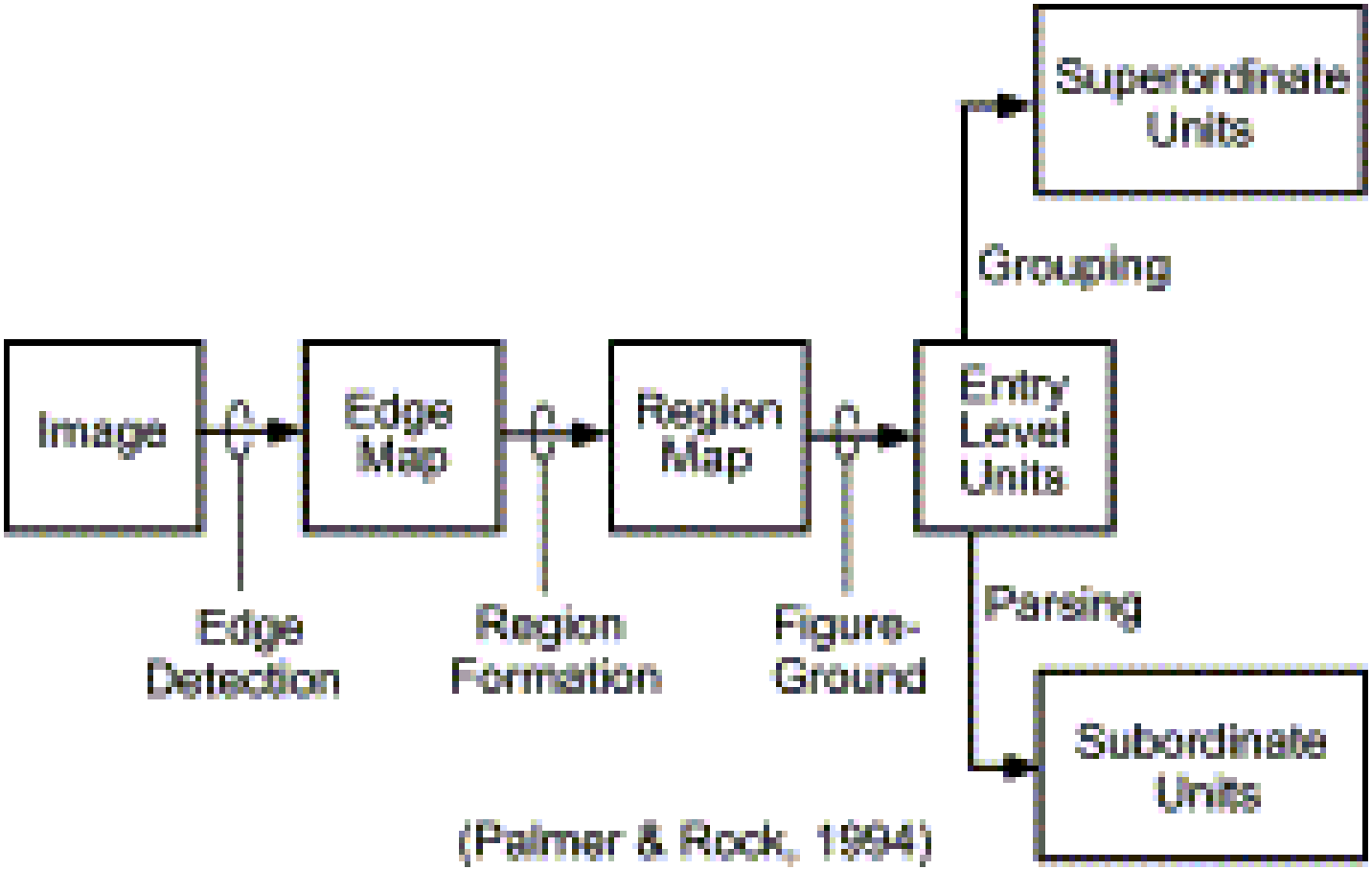
Scene perception



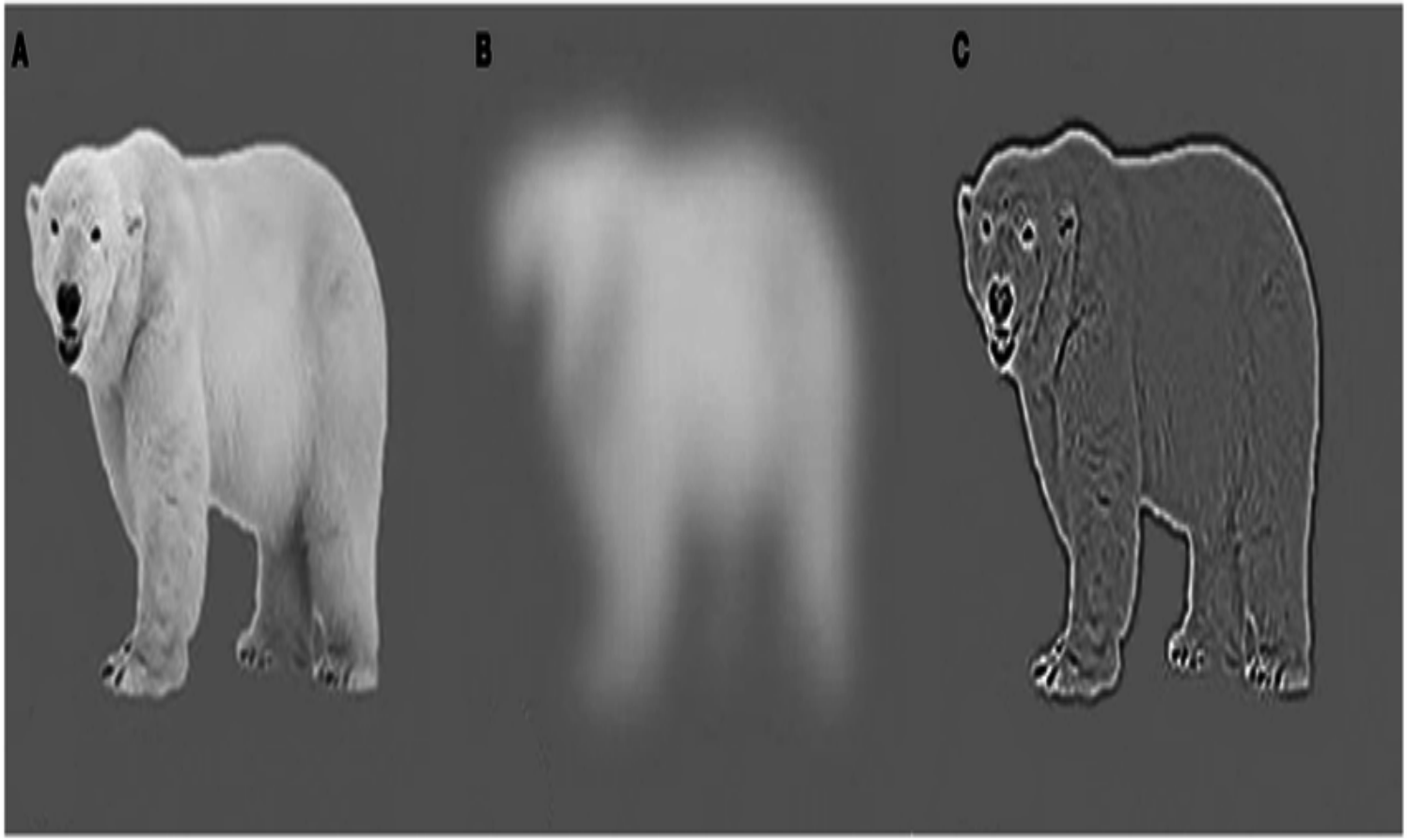
Analyzing regions/camoflage



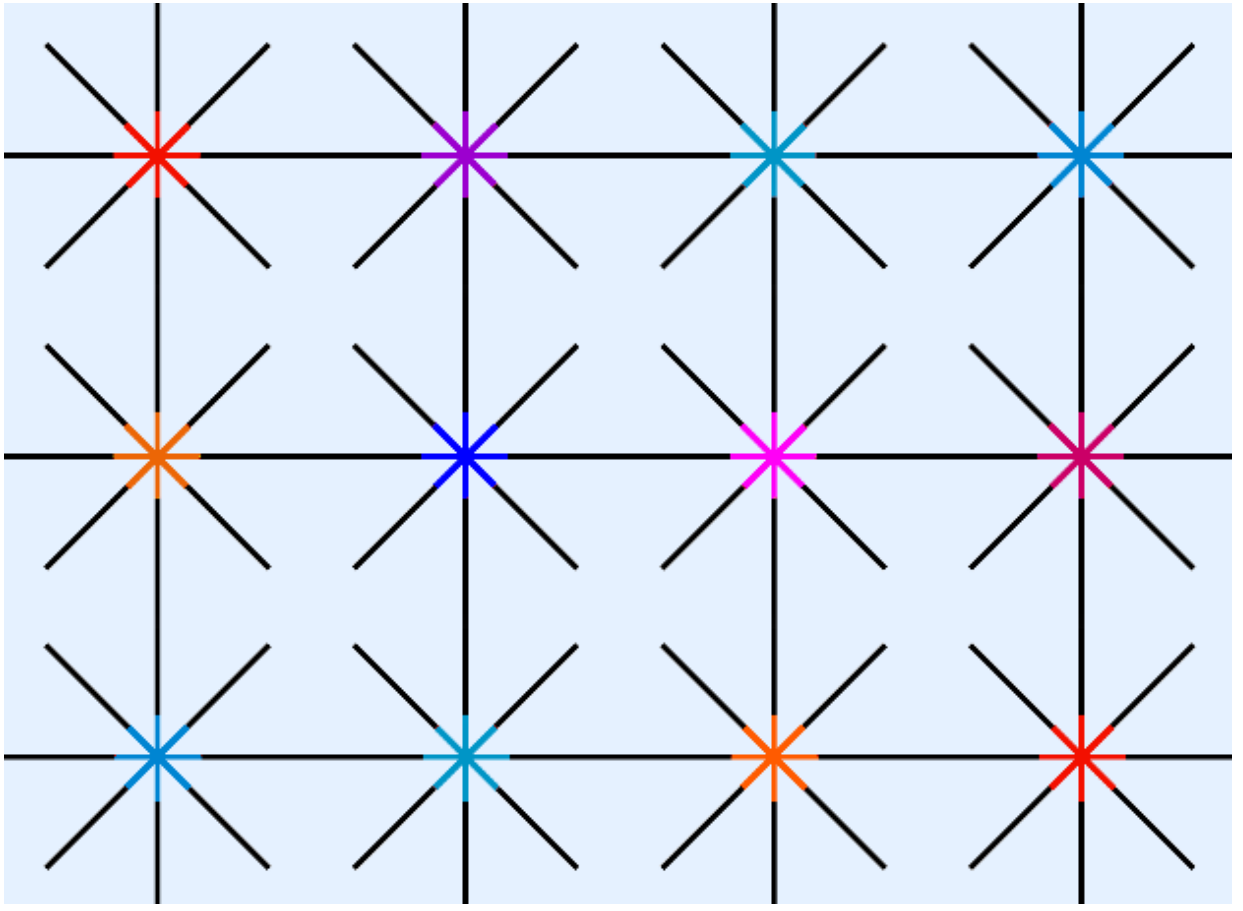
Uniform connectedness: region parsing before grouping? (Palmer & Rock)



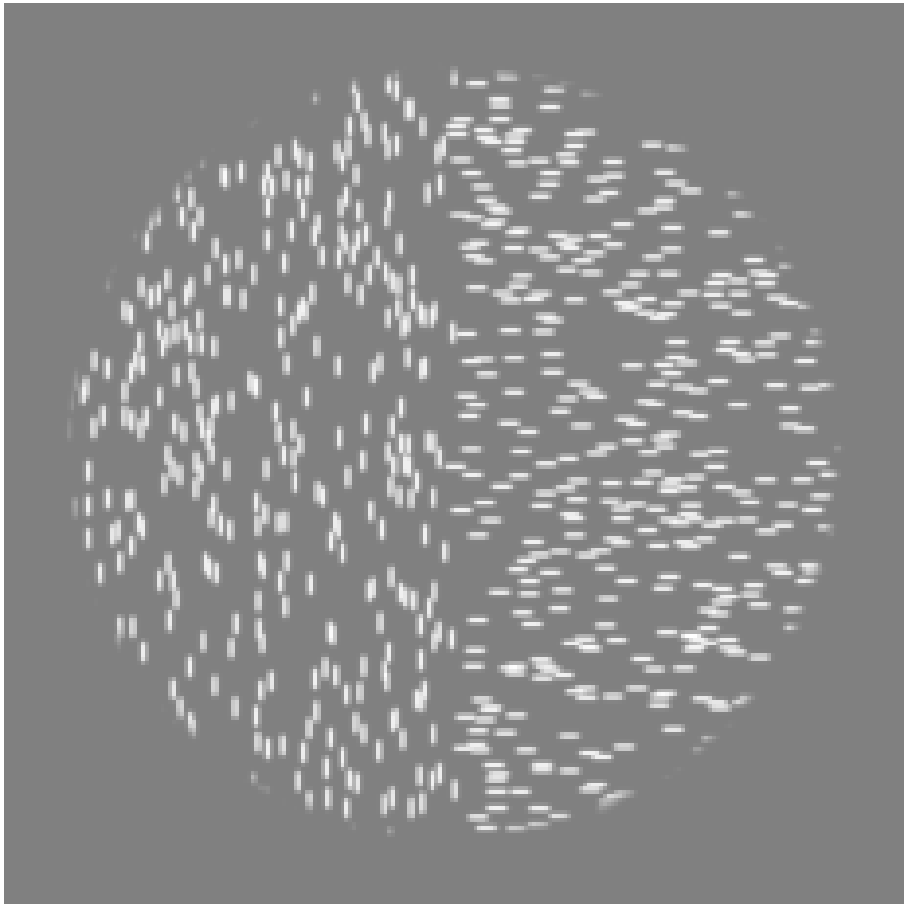
(Palmer & Rock, 1994)



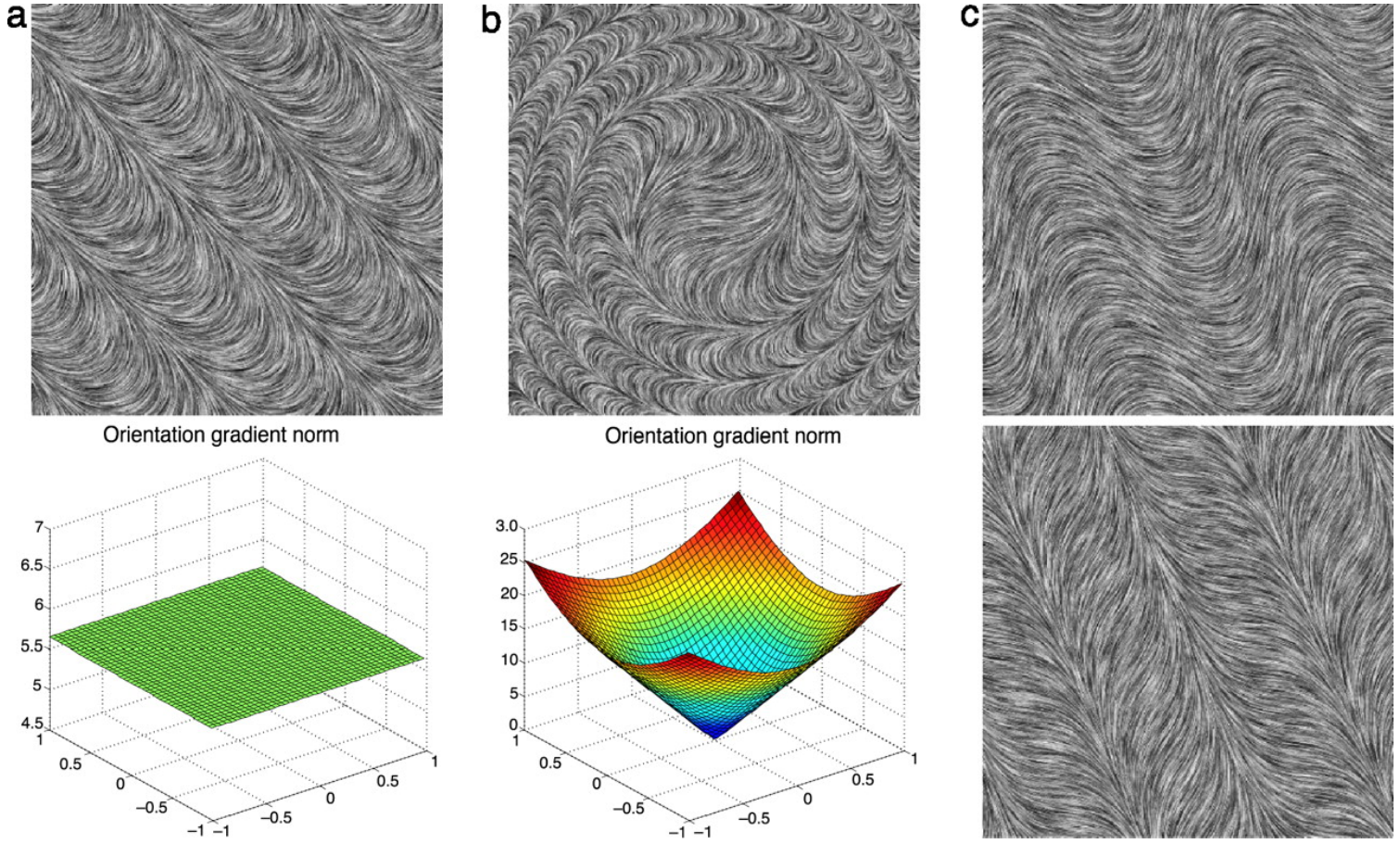
Edge detection through spatial frequency filtering



Illusory edges and spreading



Texture segregation

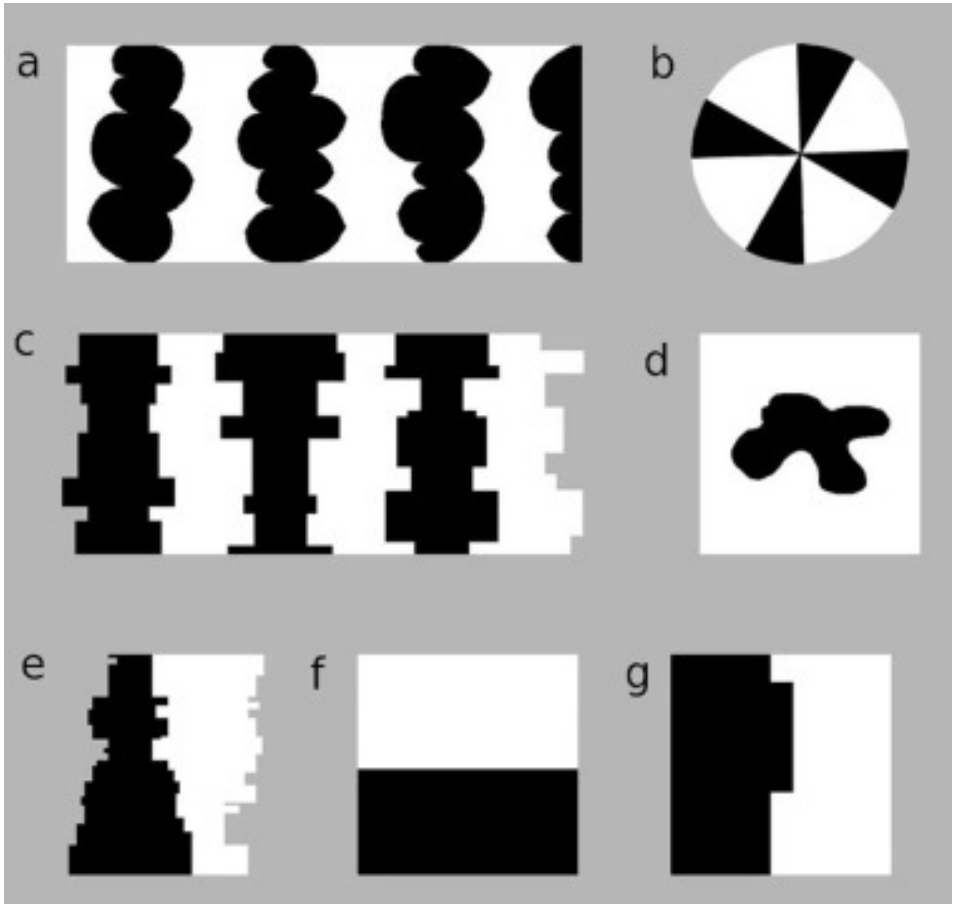


Ben-Shahar, O. (2006). Visual saliency and texture segregation without feature gradient. *Proceedings of the National Academy of Sciences of the United States of America*, *103*(42), 15704–15709. Retrieved from http://dx.doi.org/10.1073/pnas.0604410103

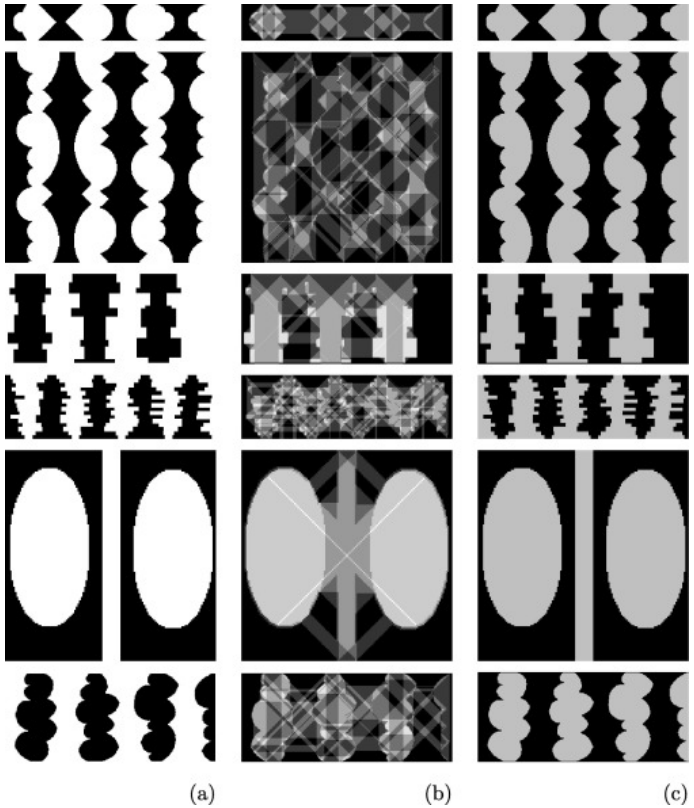
Figure/ground segregation

Figure	Ground
Thinglike	Not thinglike
Closer to observer	Farther from observer
Bounded by contour	Extends behind contour
Shape defined by contour	No shape at contour

Palmer Table 6.3.1

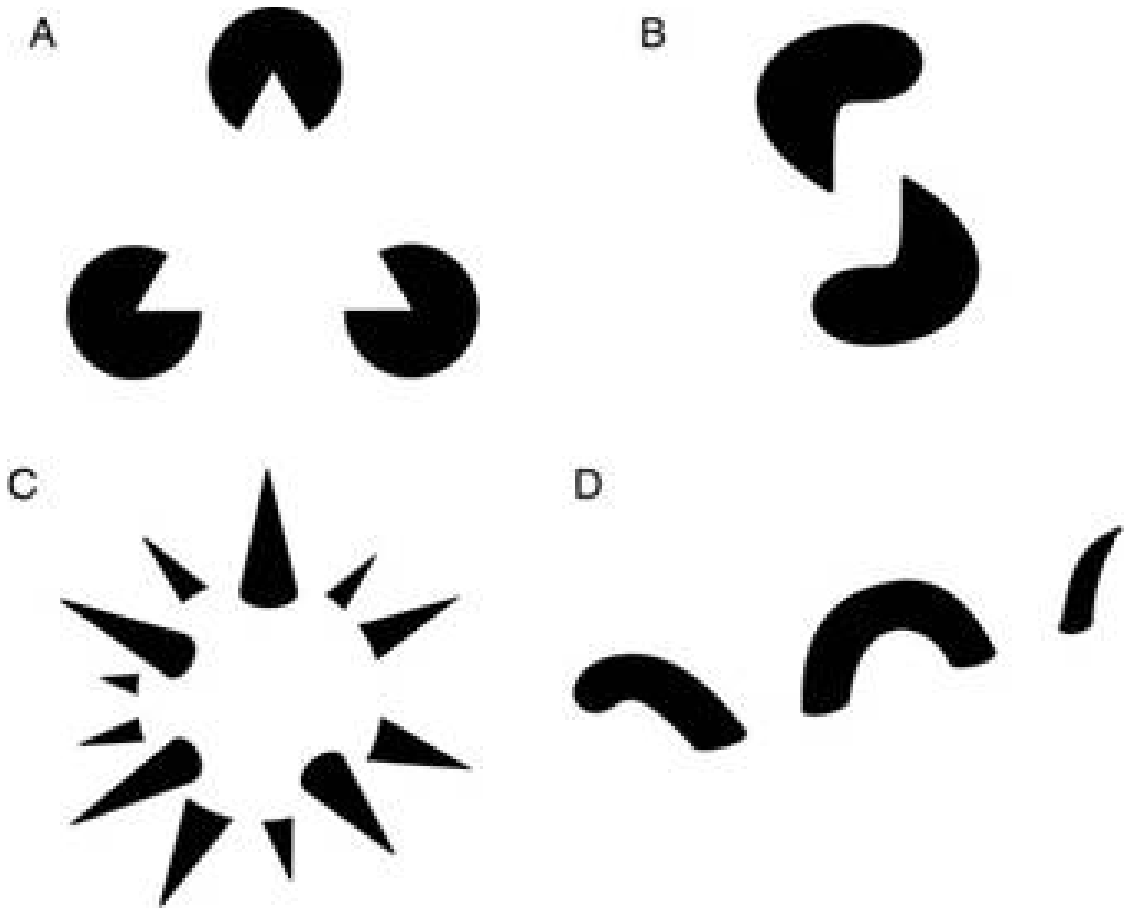


Symmetry, convexity, smallness, bottom-up polarity, lower region, protrusion

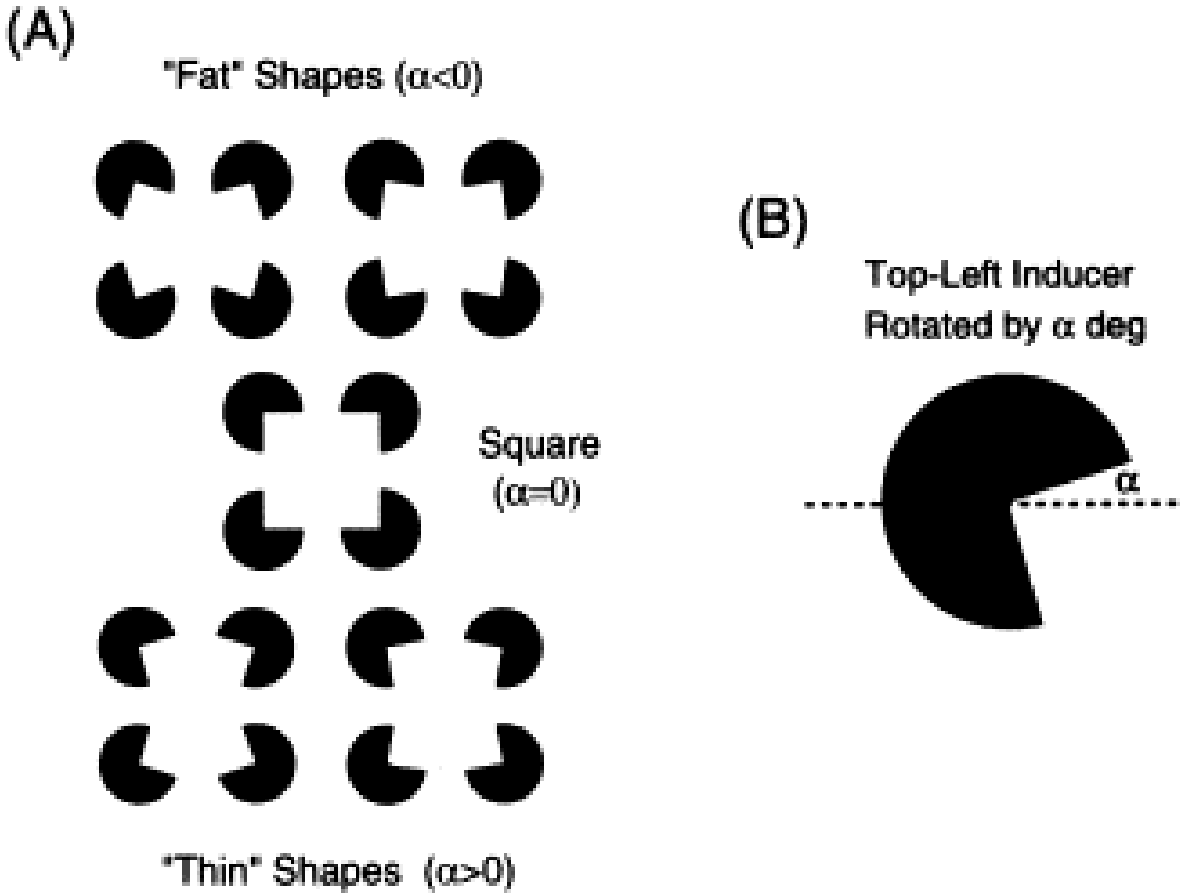


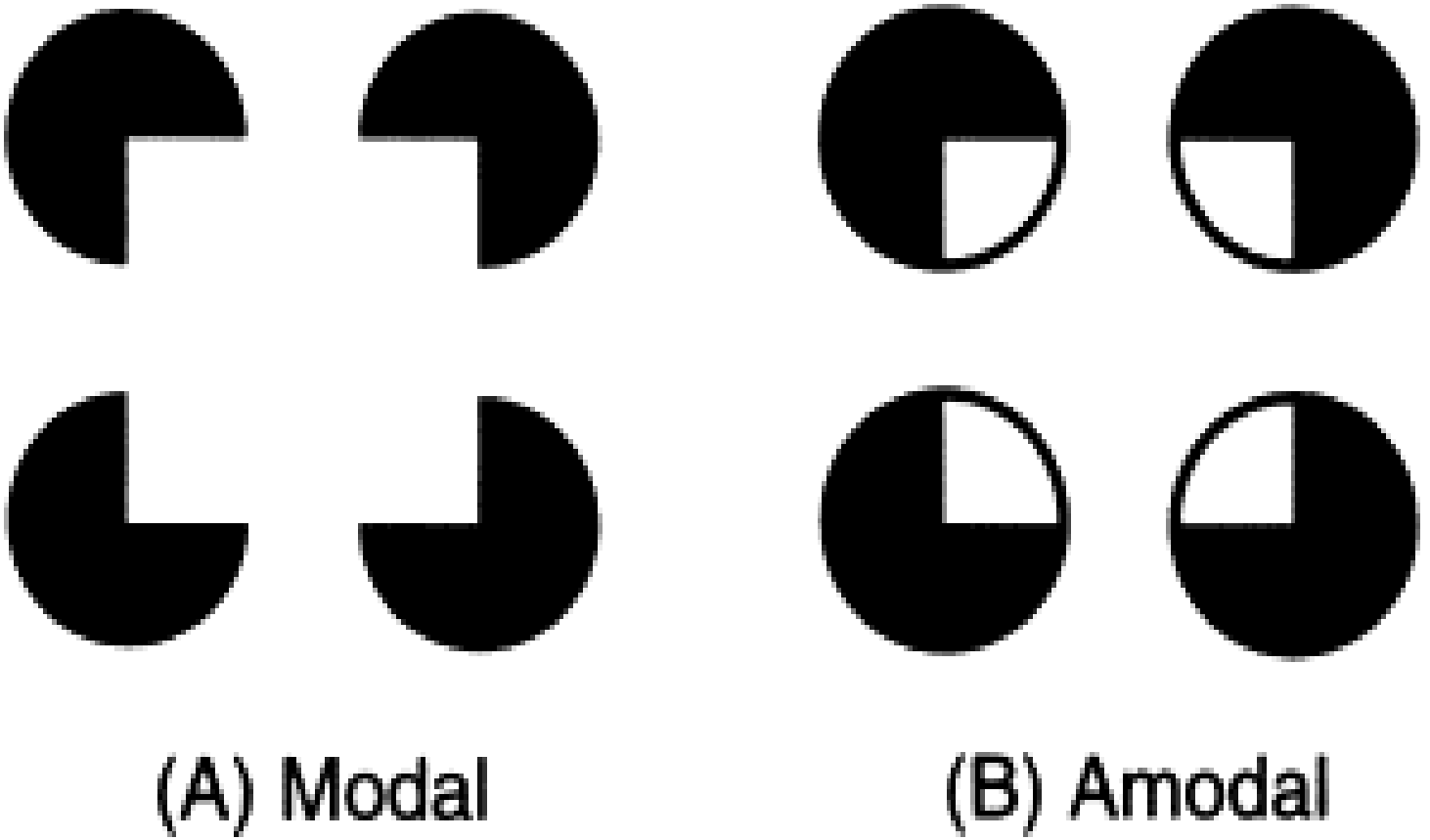
> "Figure–ground segregation can be computed without relying on image contours. Figural status estimates result from a multidirectional linear voting process."

Dimiccoli, M. (2016). Figure-ground segregation: A fully nonlocal approach. *Vision Research*, *126*, 308–317. Retrieved from http://dx.doi.org/10.1016/j.visres.2015.03.007

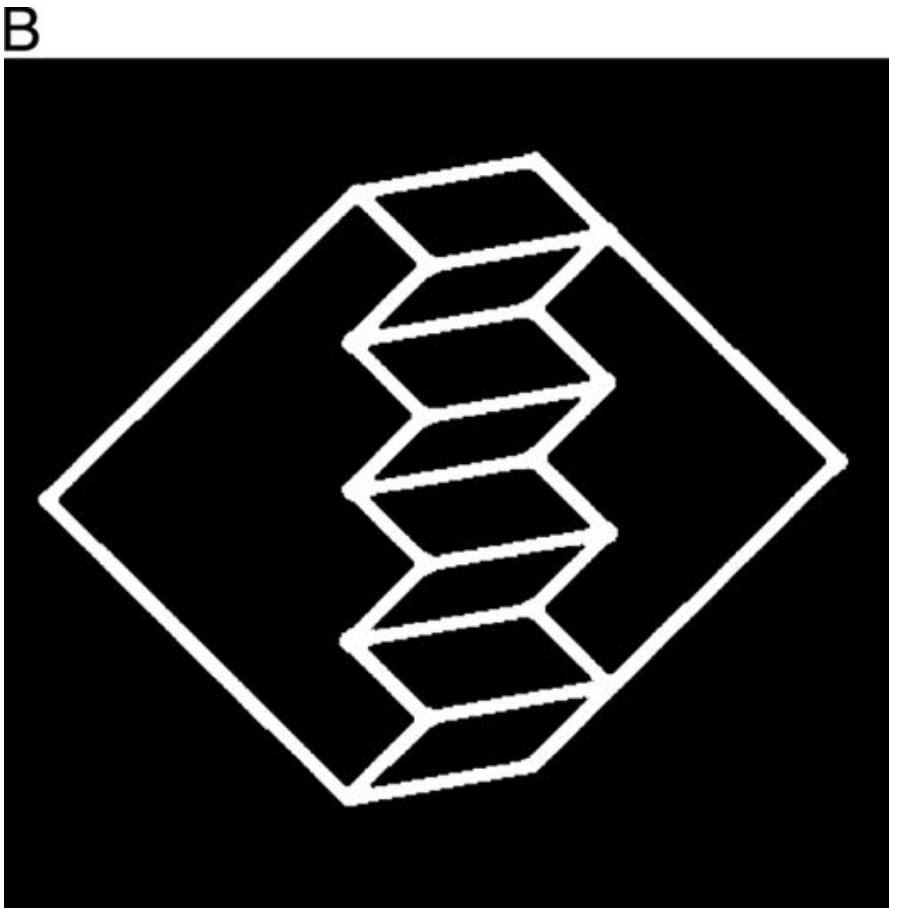


Amodal completion (perception of occluded whole) vs. **modal** completion (perception of unoccluded whole)


(A)
"Fat" Shapes (α<0)
Square
(α=0)
"Thin" Shapes (α>0)
(B)
Top-Left Inducer
Rotated by α deg
α

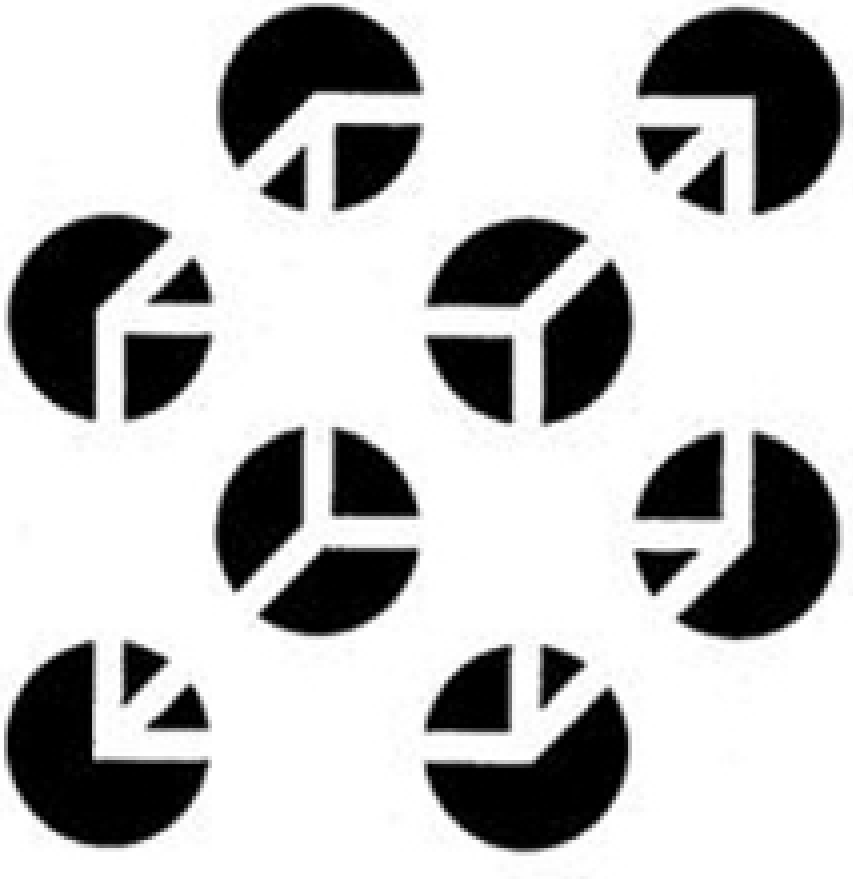


Ringach, D. L., & Shapley, R. (1996). Spatial and temporal properties of illusory contours and amodal boundary completion. *Vision Research*, *36*(19), 3037–3050. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/8917767

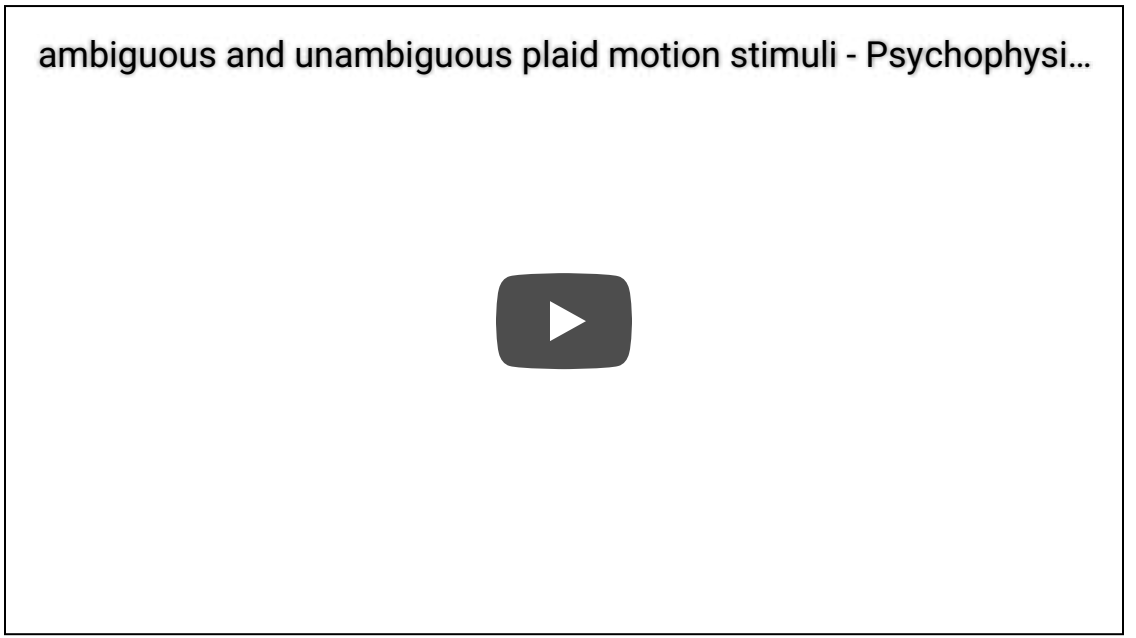


Multi-stable images

Pitts, M. A., Nerger, J. L., & Davis, T. J. R. (2007). Electrophysiological correlates of perceptual reversals for three different types of multistable images. *Journal of Vision*, *7*(1), 6. Retrieved from http://dx.doi.org/10.1167/7.1.6



Necker cube with illusory contours



Ambiguous/multi-stable vs. unambiguous plaids

Break time

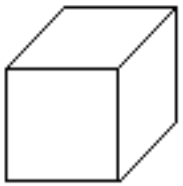
Discussion of Biederman (1987)

Principles of "non-accidentalness"

1. Collinearity
2. Curvilinearity
3. Symmetry
4. Parallel curves
5. Vertices

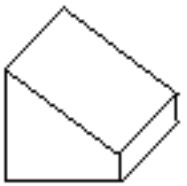
Ames chair illusion illustrates implicit "principle" of co-termination

Cube



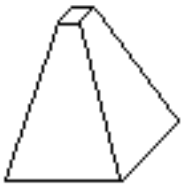
Straight Edge
Straight Axis
Constant

Wedge



Straight Edge
Straight Axis
Expanded

Pyramid

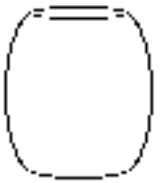


Straight Edge
Straight Axis
Expanded

Cylinder

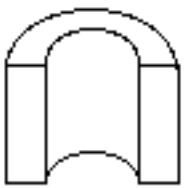
Curved Edge
Straight Axis
Constant

Barrel



Curved Edge
Straight Axis
Exp & Cont

Arch

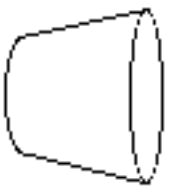


Straight Edge
Curved Axis
Constant

Cone

Curved Edge
Straight Axis
Expanded

Expanded
Cylinder



Curved Edge
Straight Axis
Expanded

Handle

Curved Edge
Curved Axis
Constant

Expanded
Handle

Curved Edge
Curved Axis
Expanded

Edge	Symmetry	Size	Axis
Straight or Curved	Rot + Ref; Ref; Asymm	Constant; Expanded; Expand & Contract	Straight or Curved

Next time...

Size, shape, orientation, & position

Slides created via the R package **xaringan**. Rendered HTML and supporting files are pushed to GitHub where GitHub's 'pages' feature is used to host and serve the course website.