



**DATA SCIENCE**  
& ANALYTICS

University of Missouri



# Data Visualization

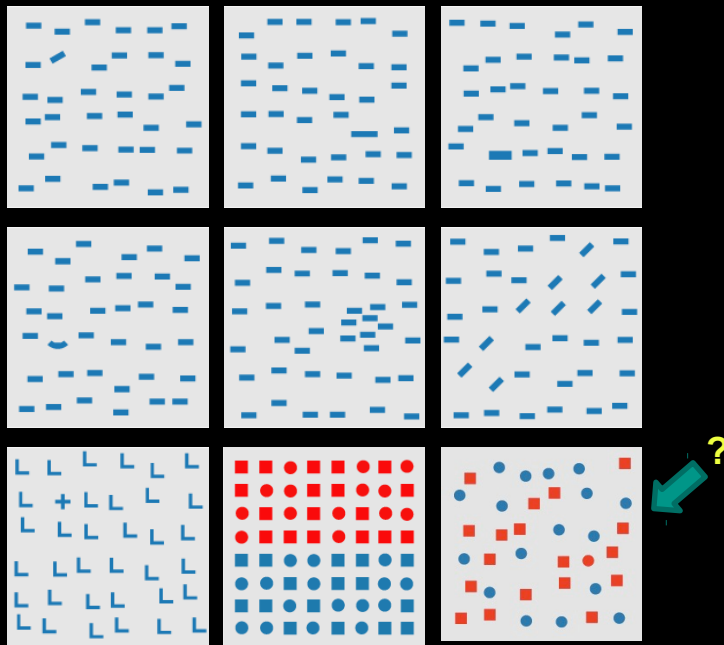
Preattentive Processing

# Preattentive Processing

- Small set of basic visual properties are processed preattentively.
- Shape and size related:
  - Line orientation, line length, line width, size, curvature, shape
- Spatial grouping
- Color
  - Hue, intensity
- Motion

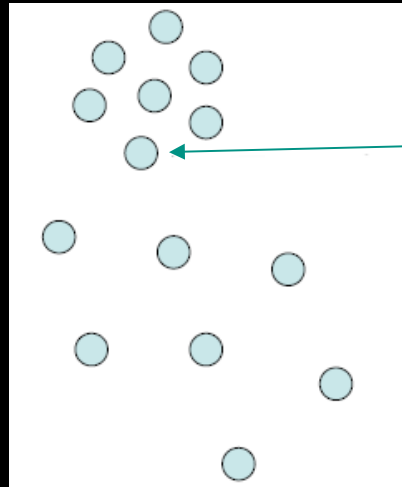
# Preattentive Processing

- Small set of basic visual properties are processed preattentively.



# Perceptual Grouping

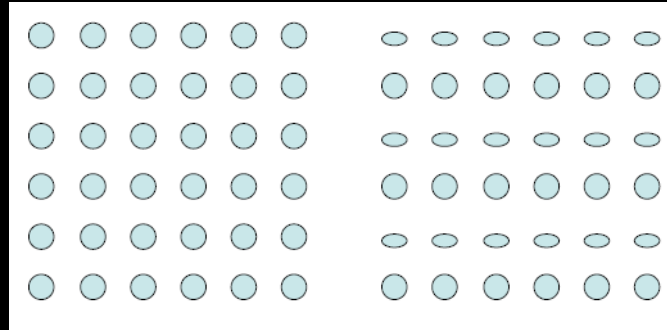
- By spatial proximity
- We group regions of similar element density.



Where does it belong ?

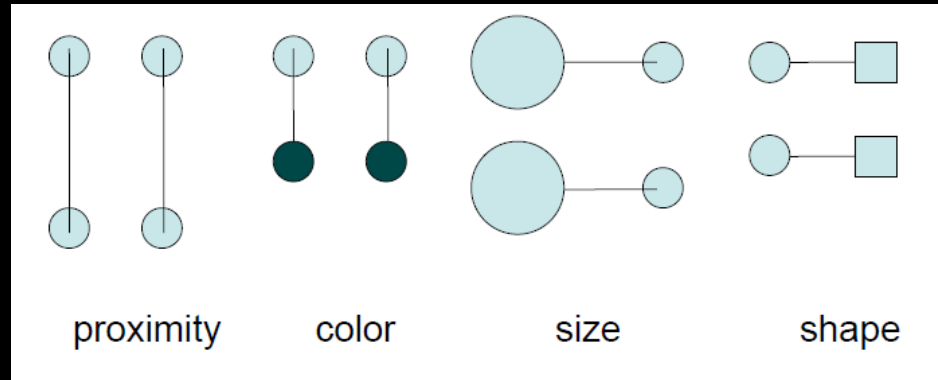
# Perceptual Grouping

- By similarity
- Similar elements tend to be grouped together.



# Perceptual Grouping

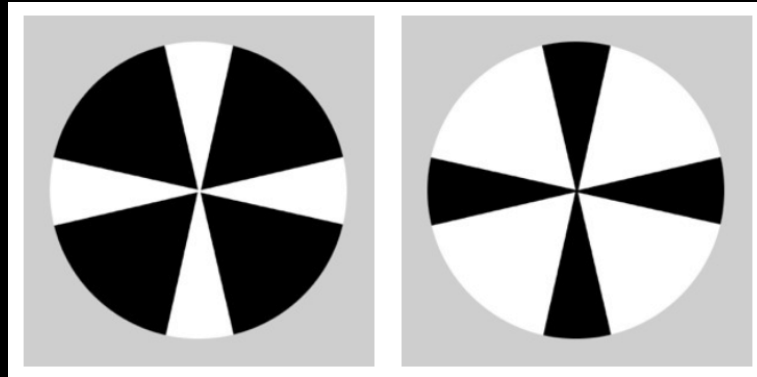
- By connectedness
- More powerful organizing principle than proximity, color, size, shape.



# Perceptual Grouping

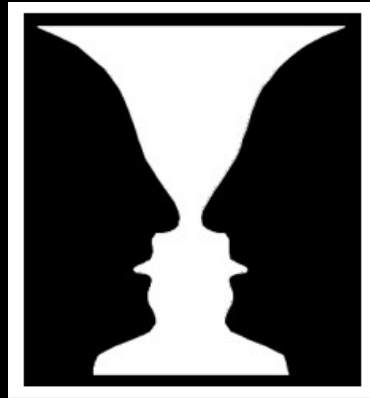
- By area
- Smaller components of a pattern tend to be perceived as an object.

Propellers



# Perceptual Grouping

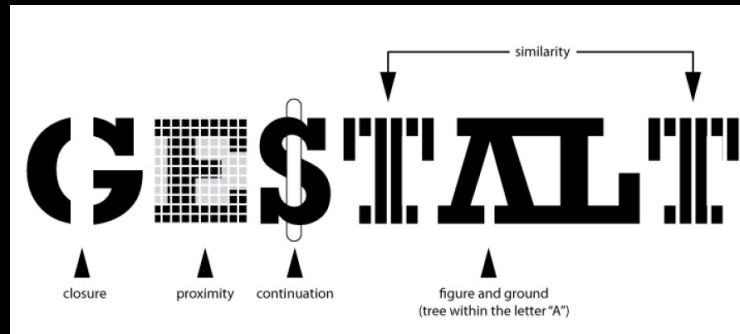
- Figure & ground
- Figure is something object-like that is perceived being in the foreground.
- Equally balanced cues for figure and ground can result in bistable perception.





# Perceptual Grouping

- It is not enough to simply show something; we need to pay attention to how it is shown.
- We use knowledge of human visual perception to make visualizations more effective.



END OF SLIDES