

The Structuralist Approach

- Approach established by Wundt (1830-1920)
 - States that perceptions are created by combining elements called sensations
 - Popular in mid to late 19th century

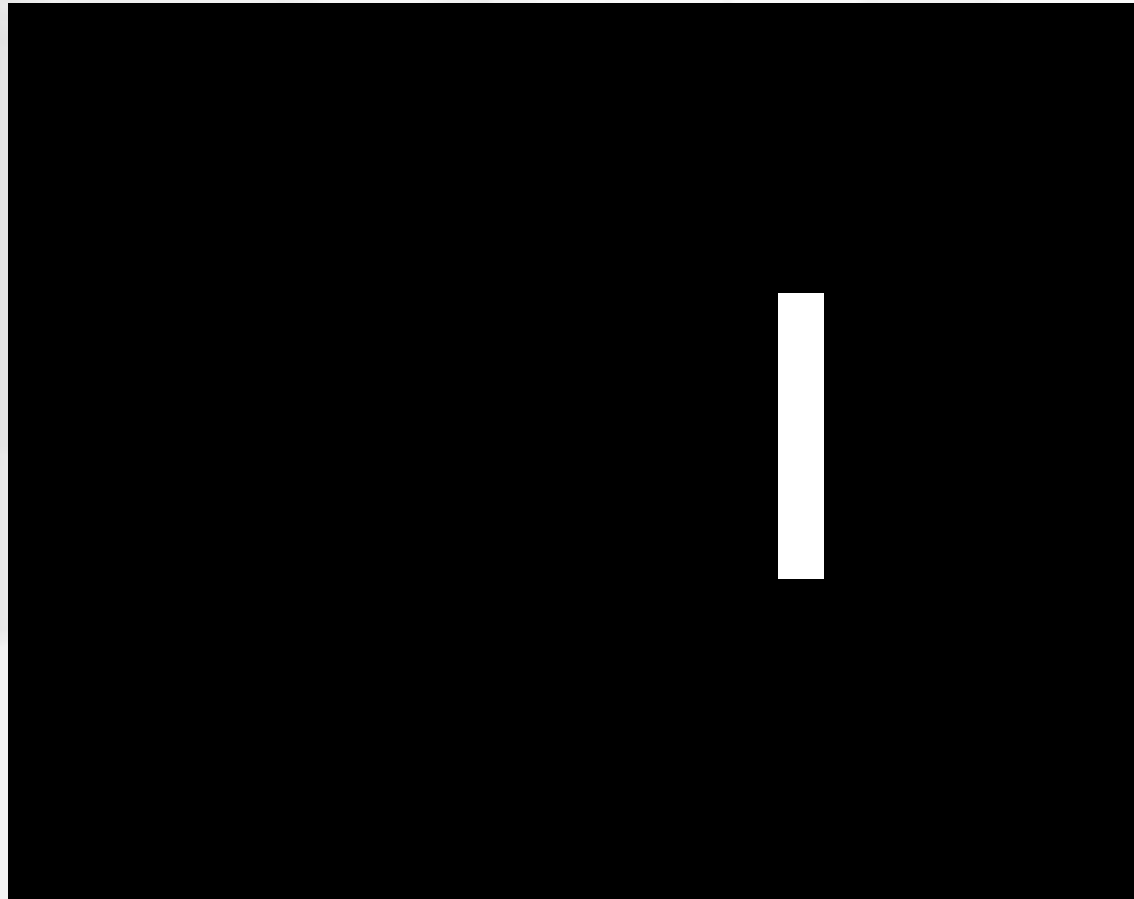


Wundt studied conscious experience by examining its *structure* or components parts (sensations, feelings) using individuals who were trained in *introspection*. This "school of psychology" became known as *structuralism*.

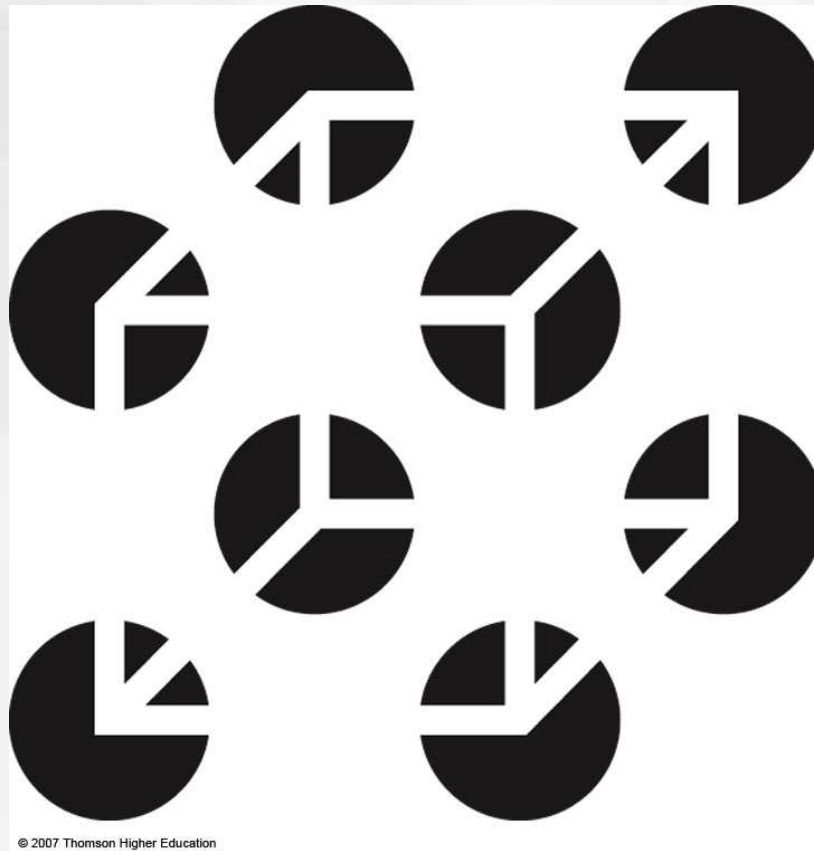
–Structuralism could not explain ‘apparent motion’



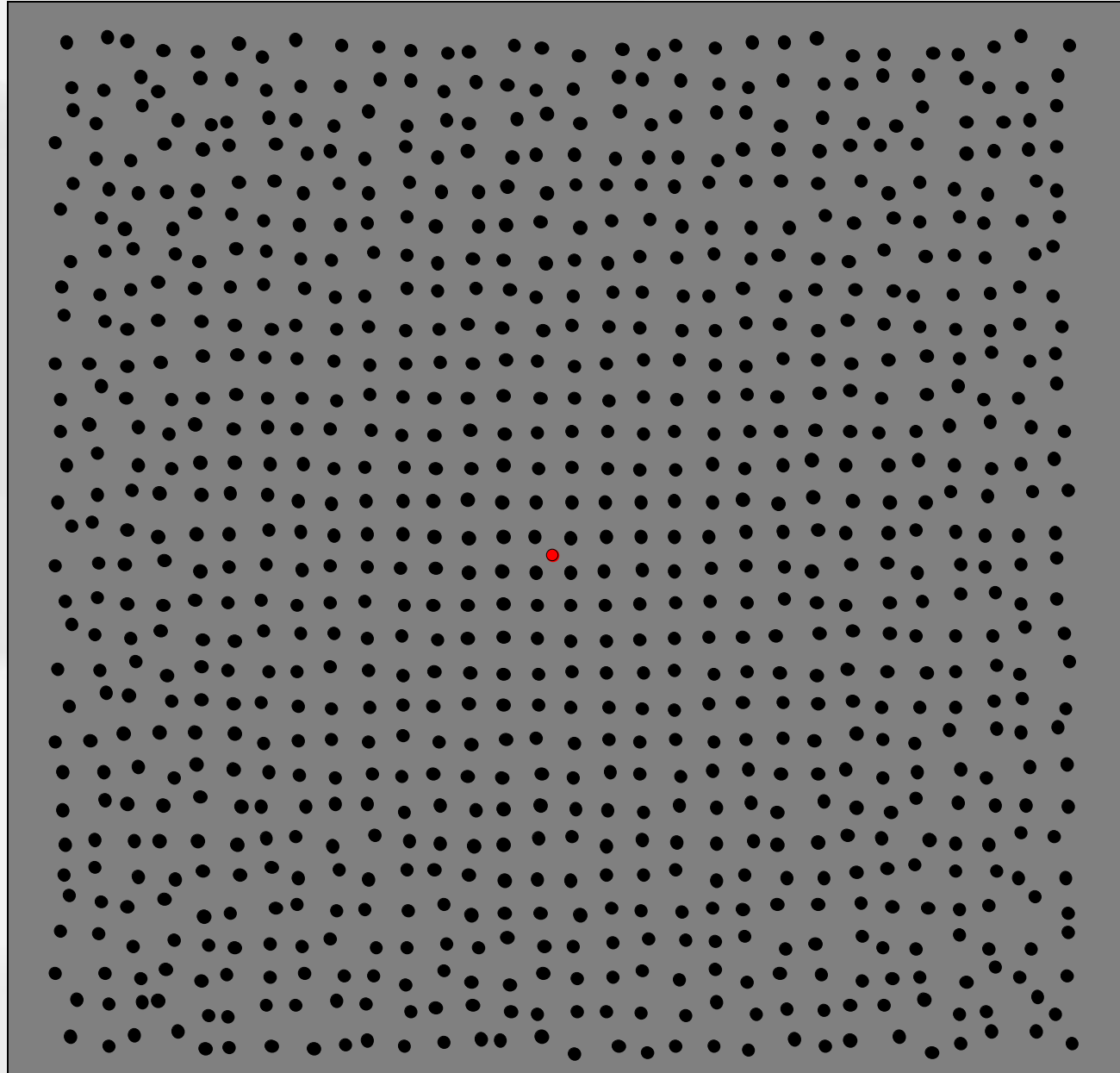
–Structuralism could not explain ‘apparent motion’



–Structuralism could not explain ‘illusory contours’ either.



It seems that the visual system 'looks' for regularity and patterns.
We often 'see' or infer structure when it's not actually there.



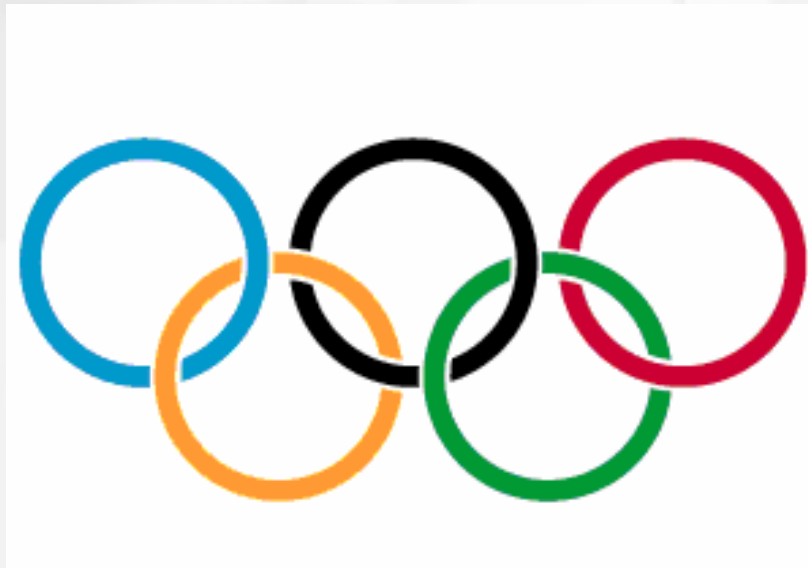
The Gestalt Approach

- According to Gestalt psychologists, the whole is different than the sum of its parts. Gestalt is a German word meaning configuration or pattern.
- Perception is **not** built up from sensations but is a result of *perceptual organization*
- Gestalt principles do not make strong enough predictions to qualify as “laws”
 - They are better thought of as *heuristics* - “best guess rules”

The following ‘laws’ describe heuristics for how elements in a scene tend to group together.

The Gestalt laws of perceptual organization

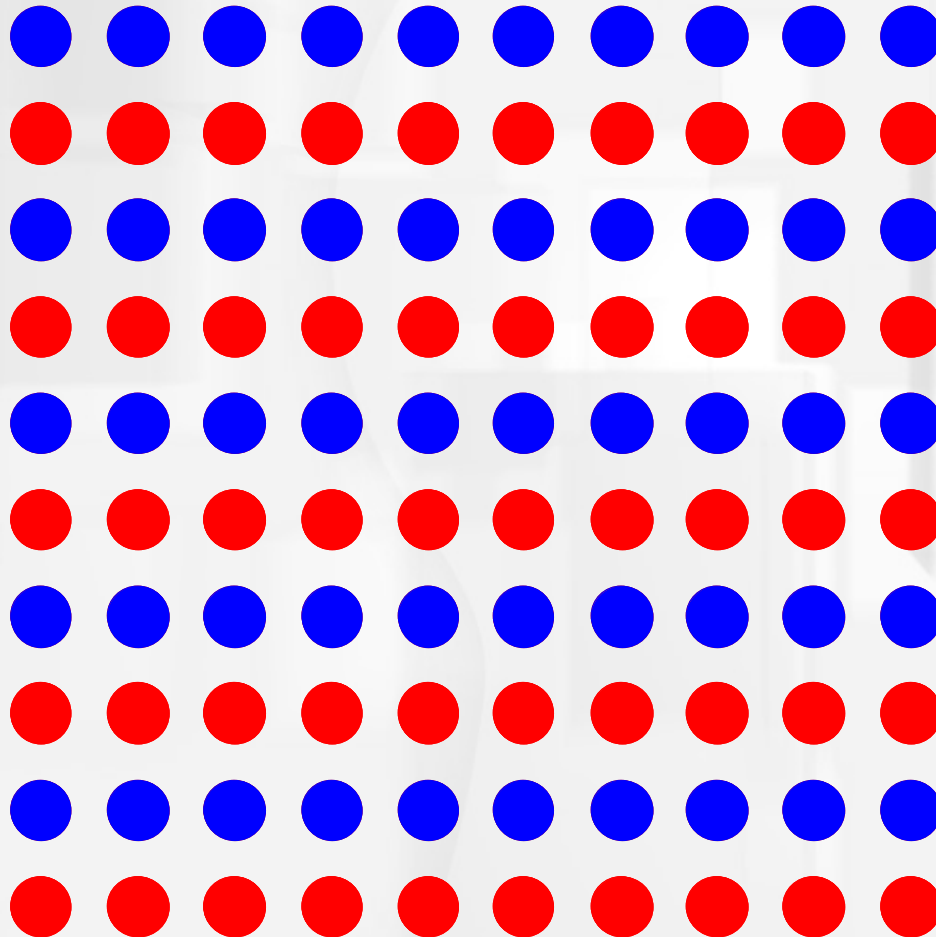
Pragnanz: Every stimulus pattern is seen in such a way that the resulting structure is as simple as possible.



The Gestalt laws of perceptual organization

Similarity:

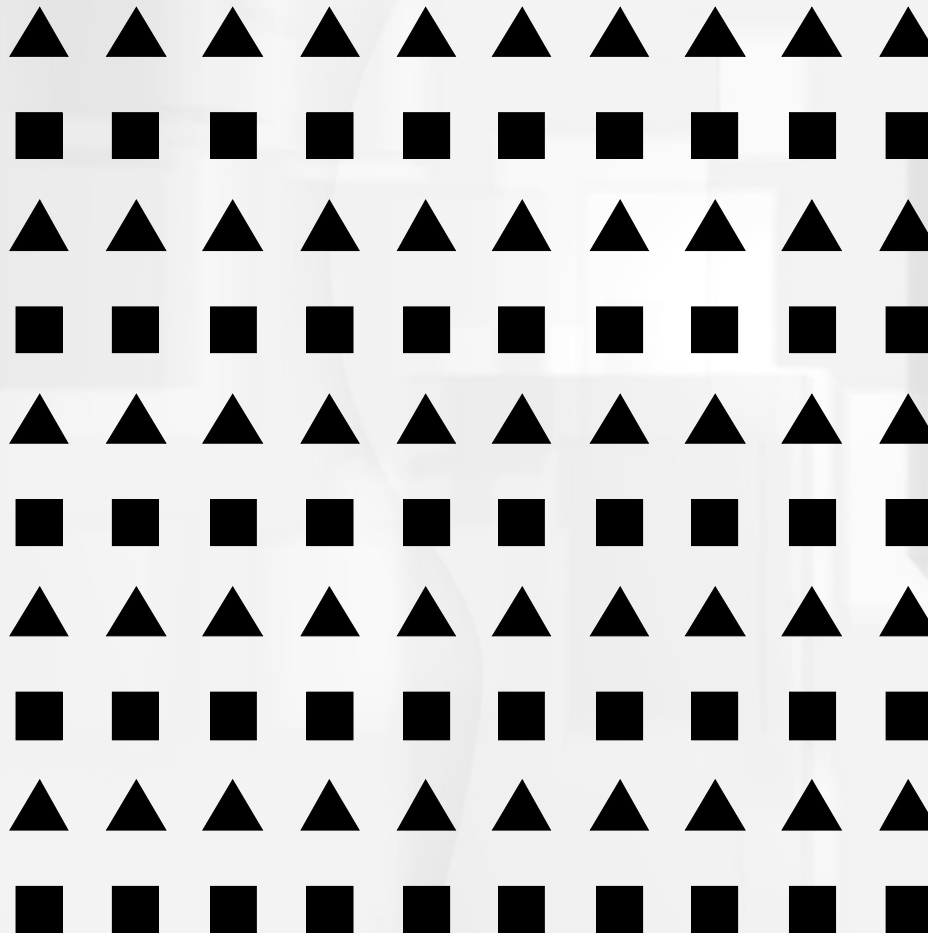
Similar things appear to be grouped together.



The Gestalt laws of perceptual organization

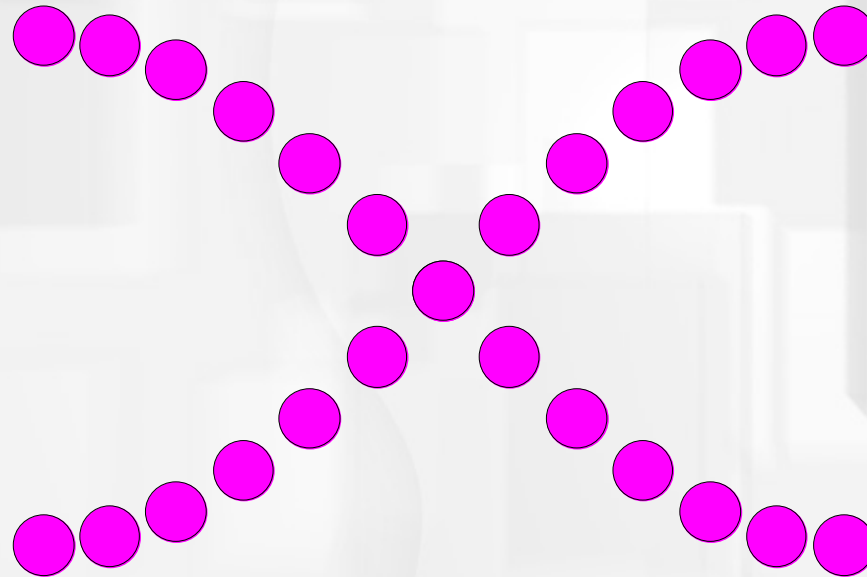
Similarity:

Similar things appear to be grouped together.



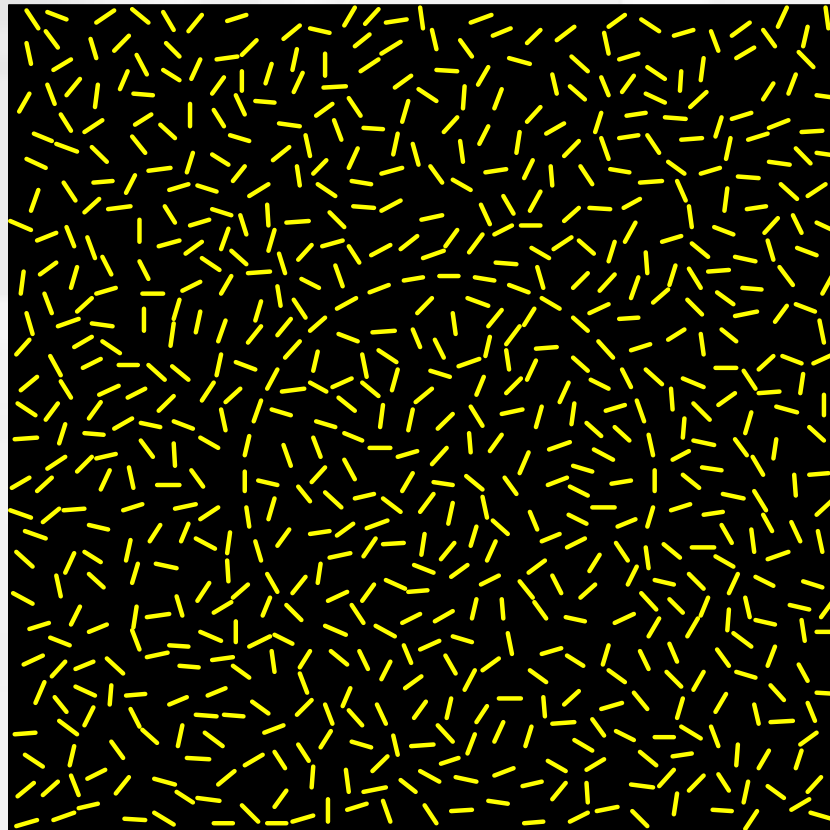
The Gestalt laws of perceptual organization

Good continuation: Points that, when connected, result in contours. These contours follow the smoothest path.



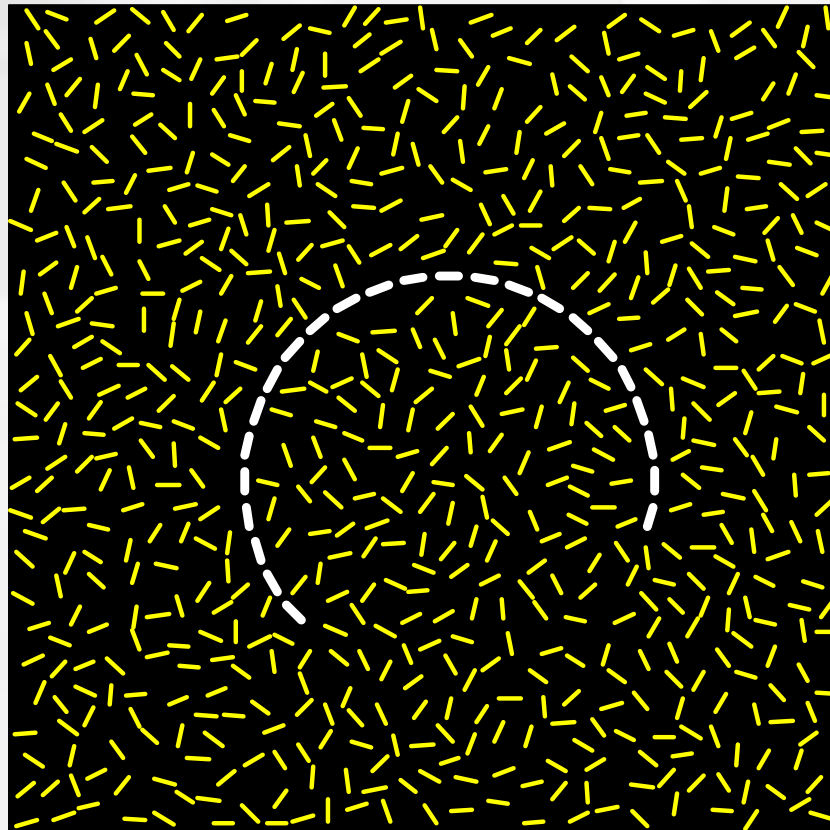
The Gestalt laws of perceptual organization

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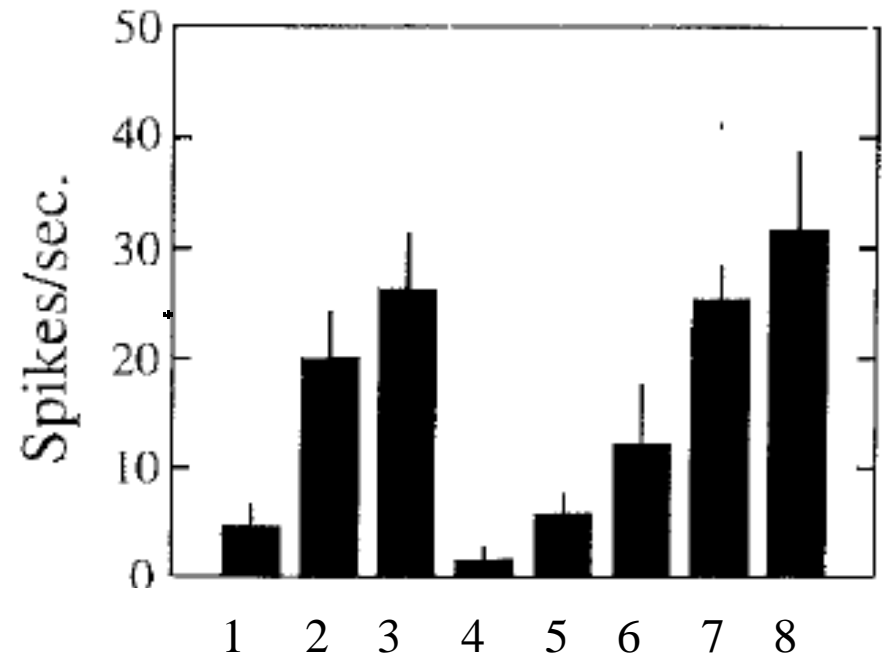
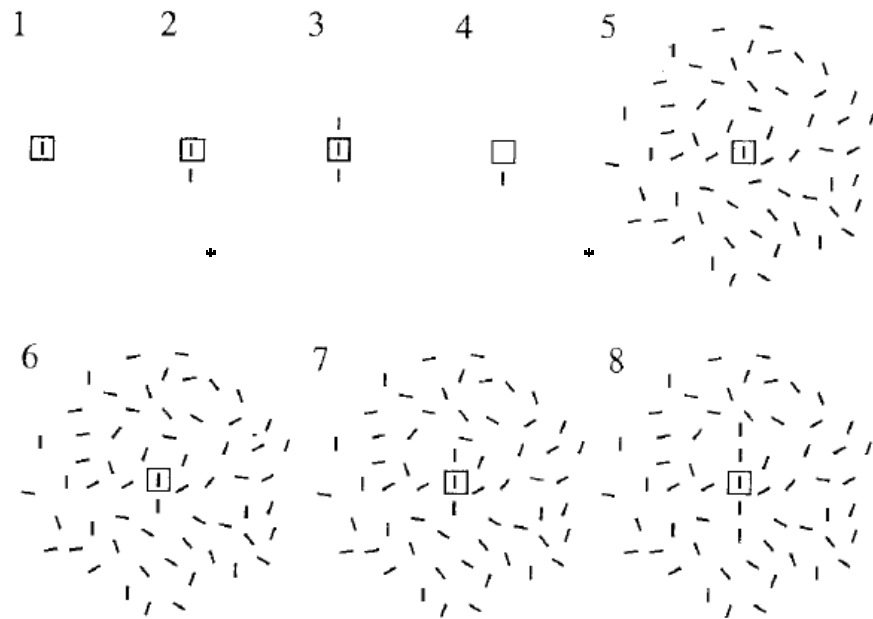


The Gestalt laws of perceptual organization

Good continuation: Points that, when connected, result in contours, and these contours follow the smoothest path.



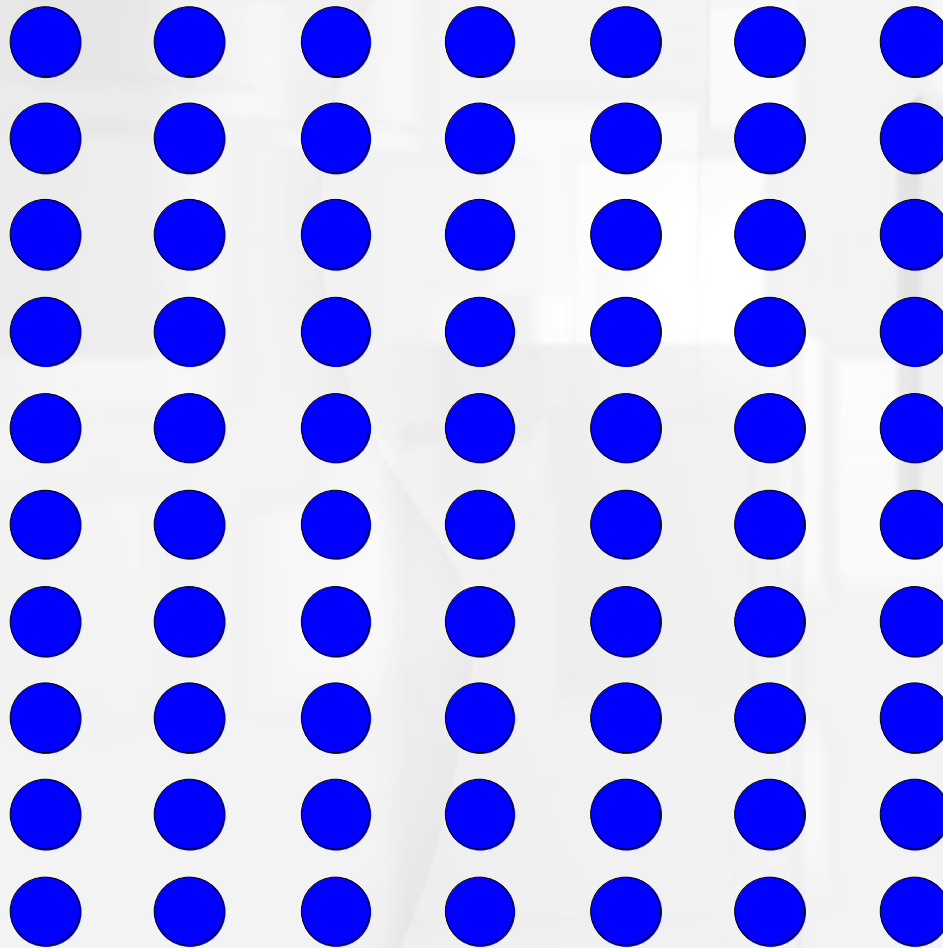
Neurons in V1 seem to support 'good continuation'



Improvement in visual sensitivity by changes in local context: Parallel studies in human observers and in V1 of alert monkeys Kapadia, Ito, Gilbert, and Westheimer Neuron, 1995

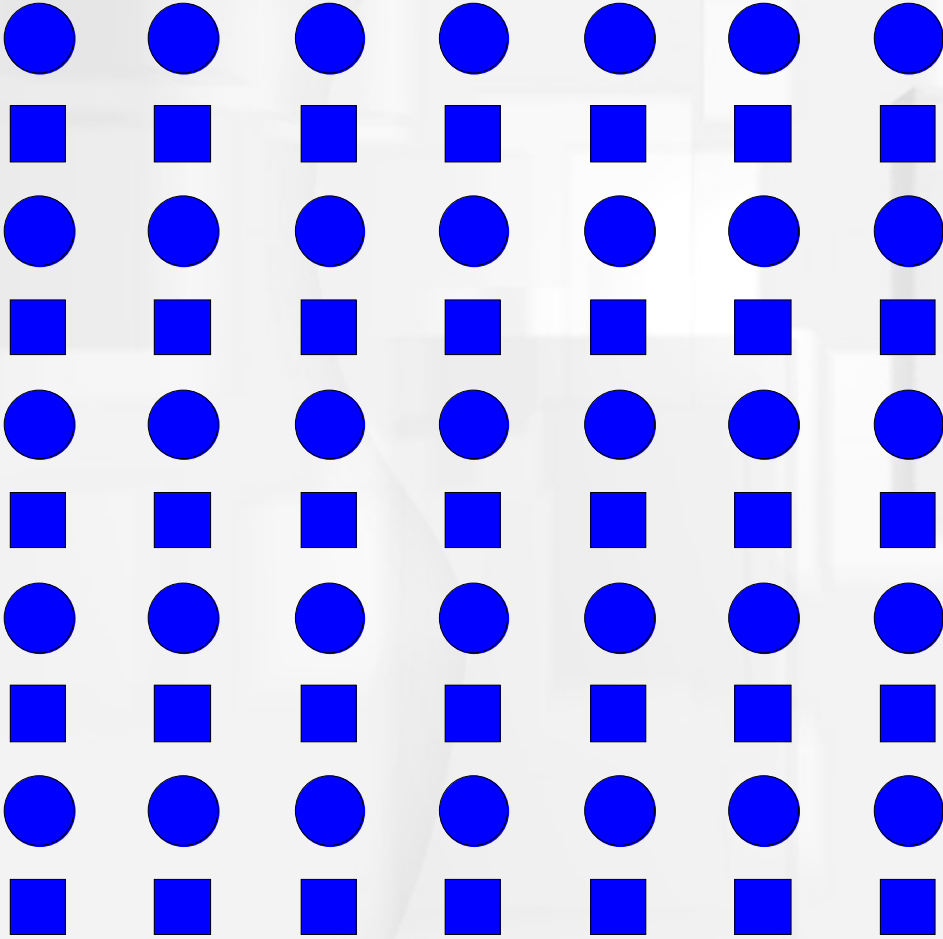
The Gestalt laws of perceptual organization

Proximity – (nearness) things that are near to each other are grouped together



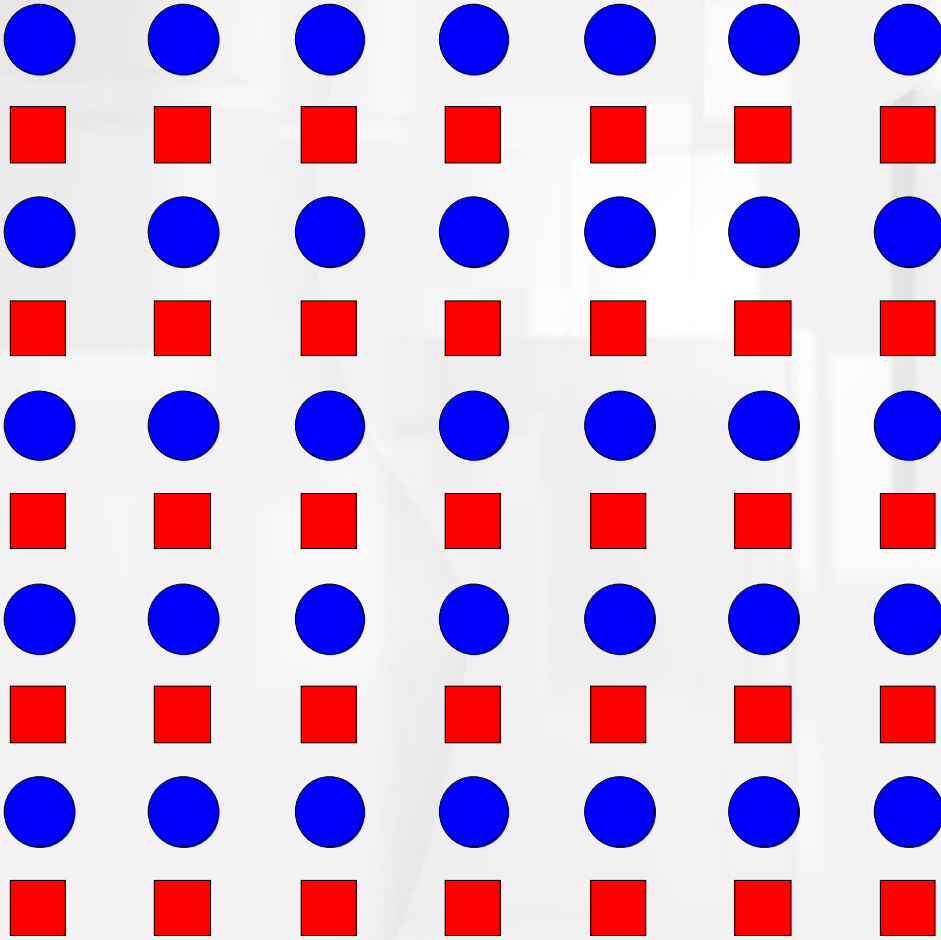
The Gestalt laws of perceptual organization

Proximity vs. Similarity Which one wins?



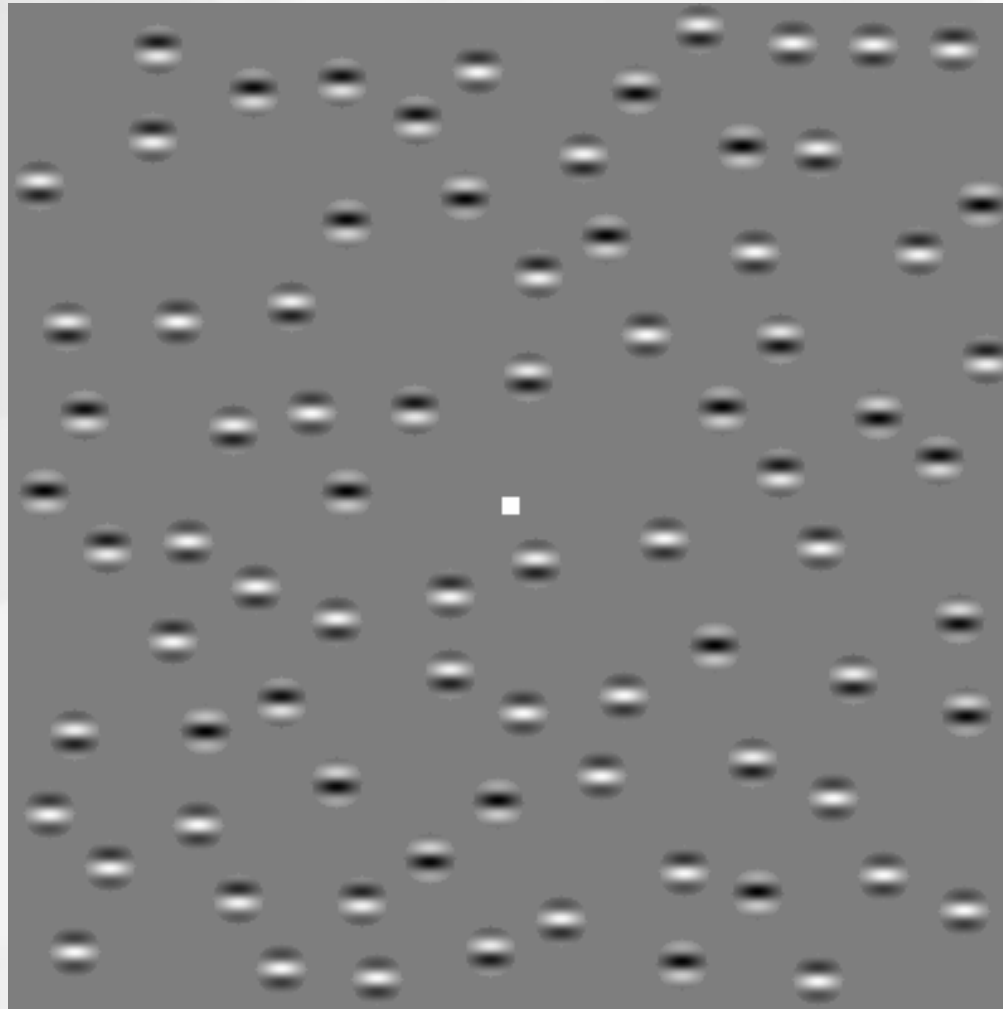
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It depends...



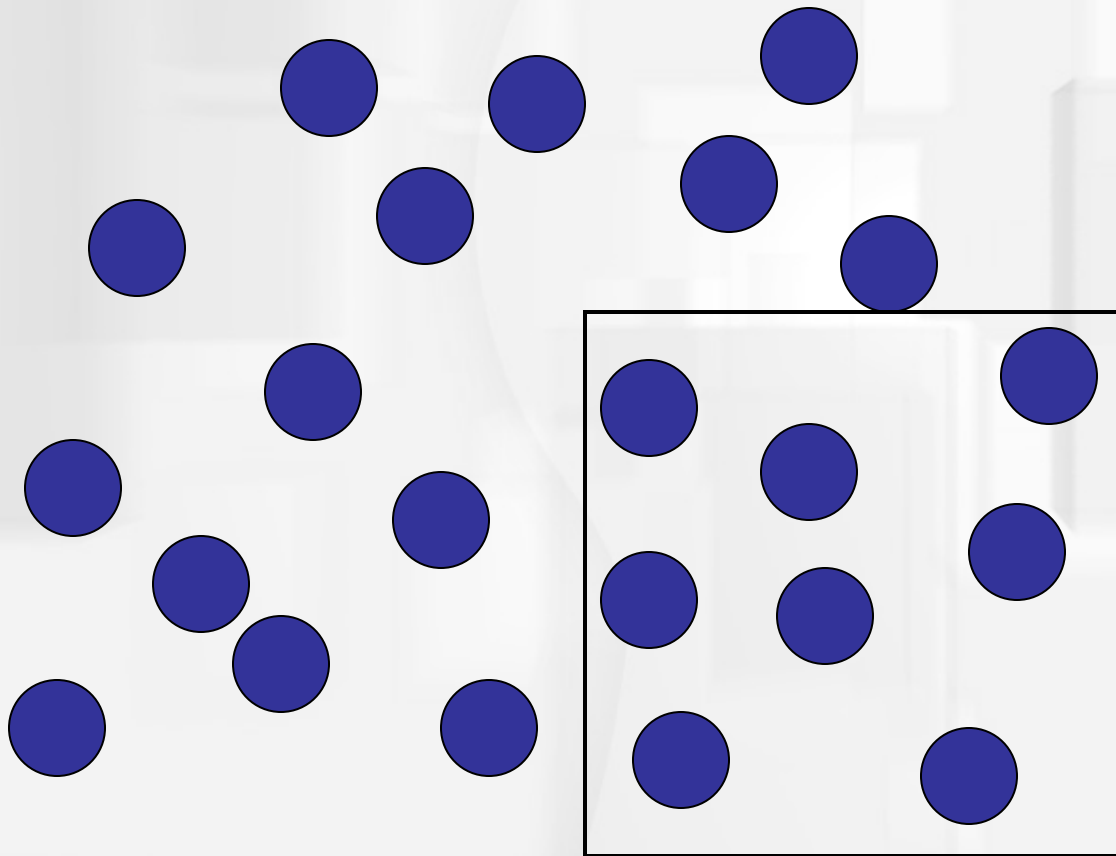
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Common Fate – things that move together belong together



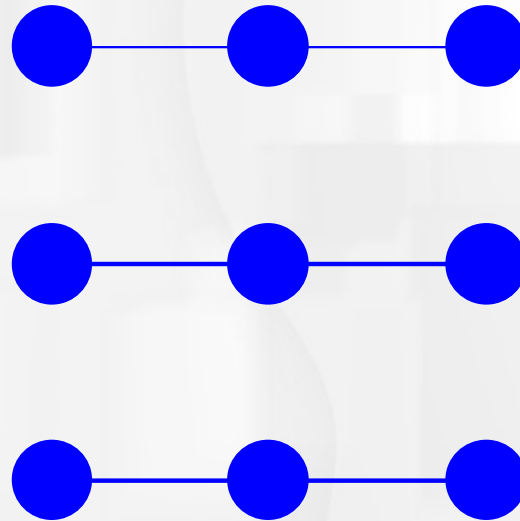
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Common region - elements in the same region tend to be grouped together



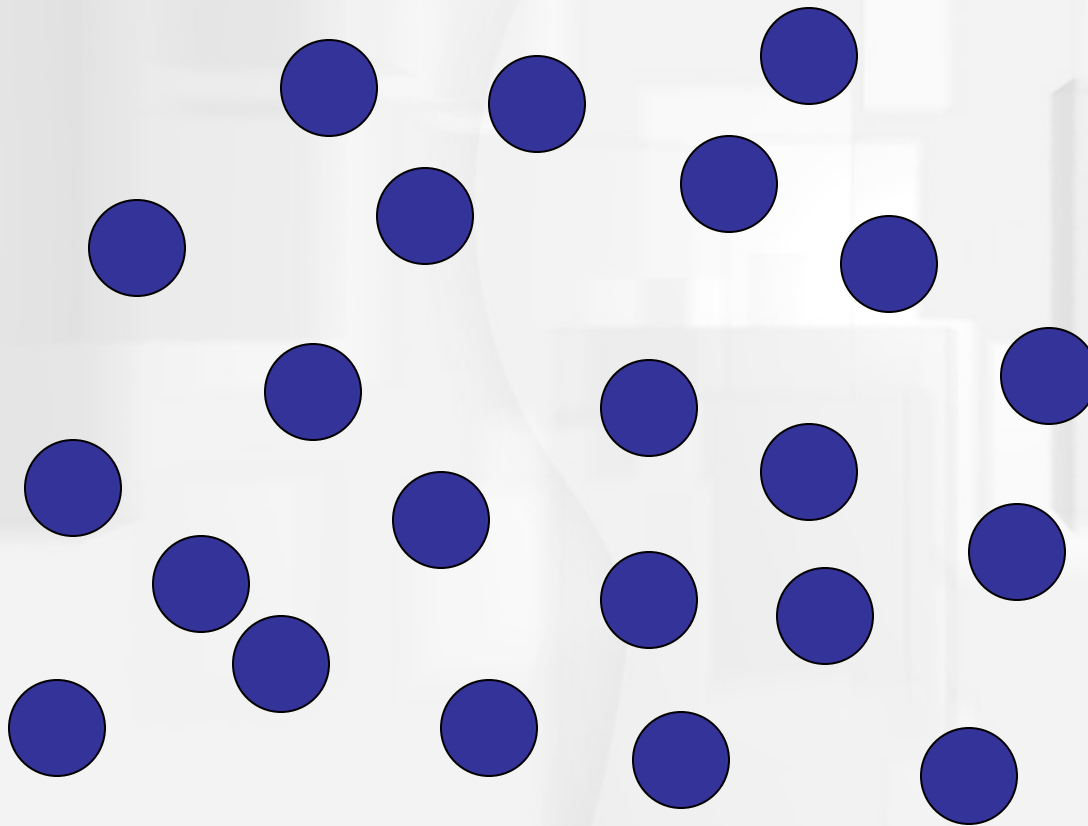
The Gestalt laws of perceptual organization

Uniform connectedness – a connected region of visual properties is perceived as single unit



The Gestalt laws of perceptual organization

Synchrony - elements occurring at the same time are seen as belonging together.



The Gestalt laws of perceptual organization

Meaningfulness or Familiarity- Things are more likely to form groups if the groups appear meaningful or similar.



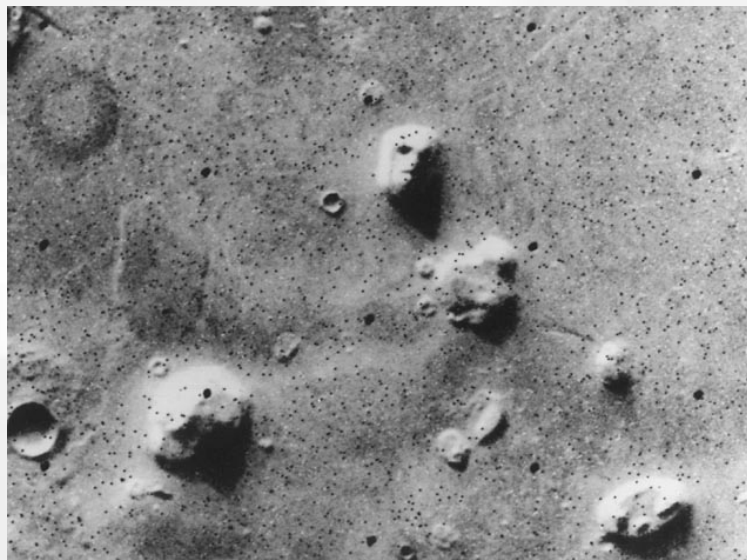
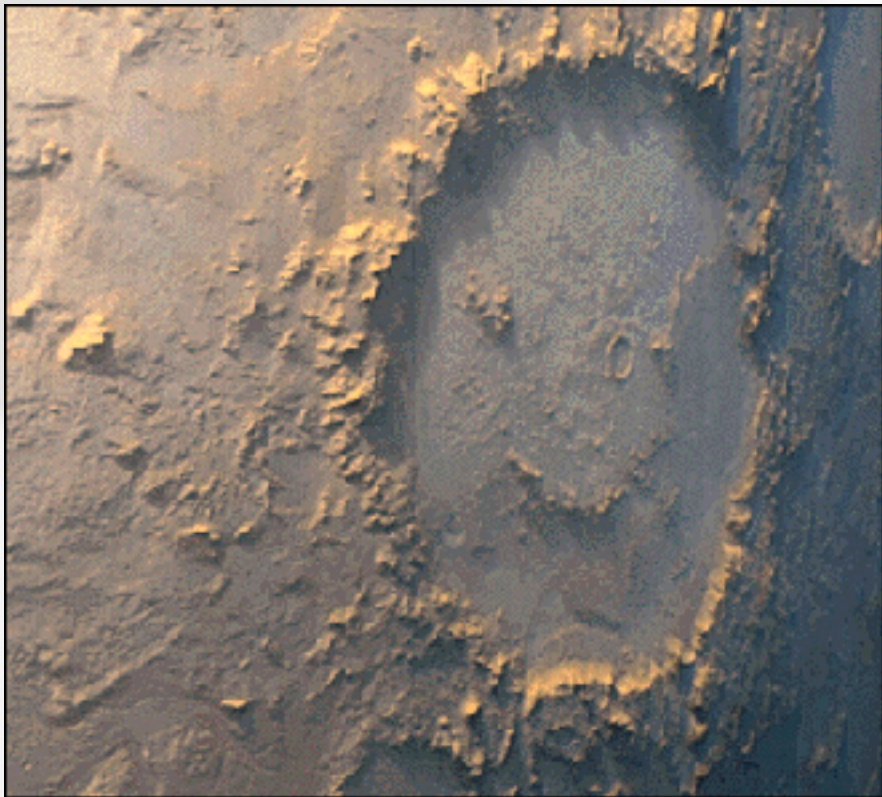
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Bev Doolittle (1985)

Pareidolia (payr.eye.DOH.lee.uh) *n.* The erroneous or fanciful perception of a pattern or meaning in something that is actually ambiguous or random.



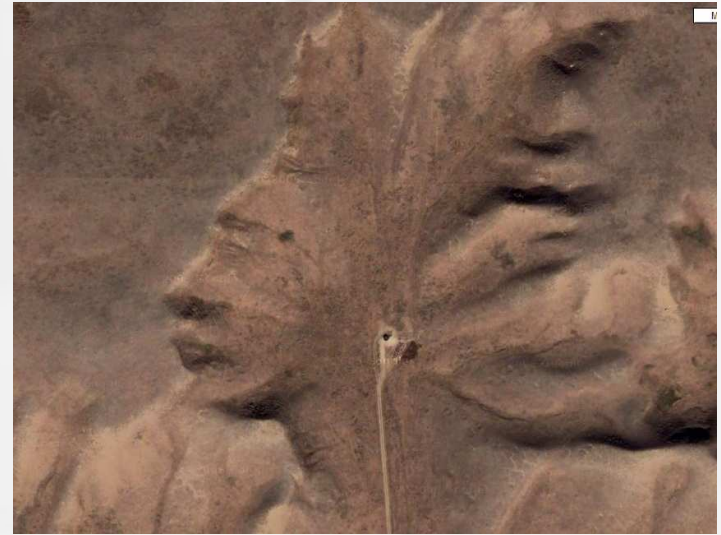
On Mars



On the Moon



On (Google) Earth



In smoke and fire and snow



In smoke and fire and snow

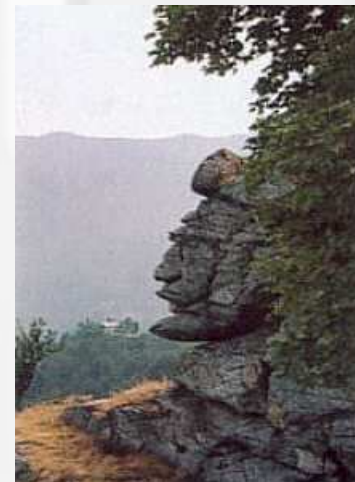
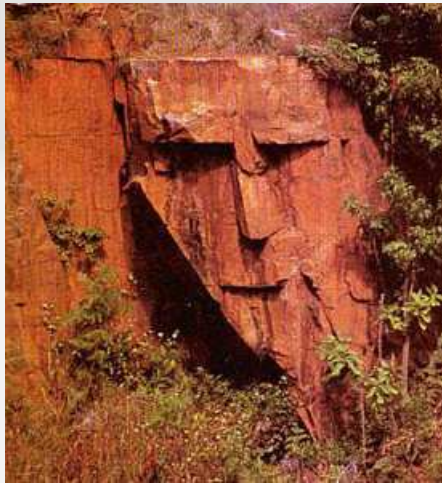


October 16, 2007: Is this Pope John Paul II waving from beyond the grave? Vatican TV director says yes

This fiery figure is being hailed as Pope John Paul II making an appearance beyond the grave.

The image, said by believers to show the Holy Father with his right hand raised in blessing, was spotted during a ceremony in Poland to mark the second anniversary of his death.

In rocks



In trees



On food.



Do cars have faces?

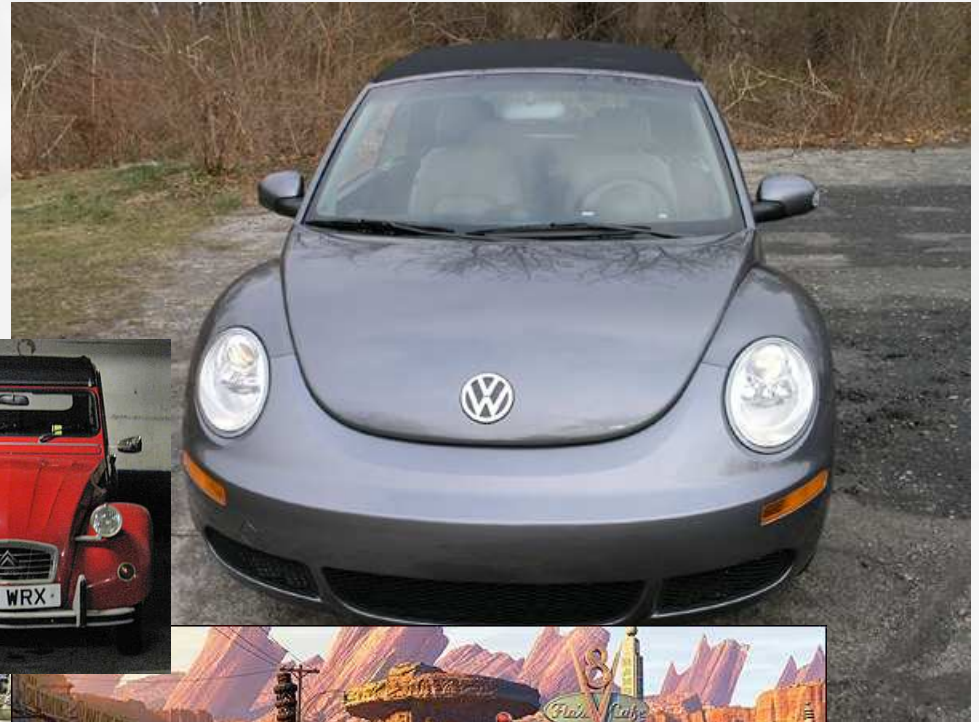


Figure-Ground Segregation

- Determining what part of environment is the figure so that it “stands out” from the background



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Figure-Ground Segmentation

Figure is usually:

In the lower part of the display

Symmetric

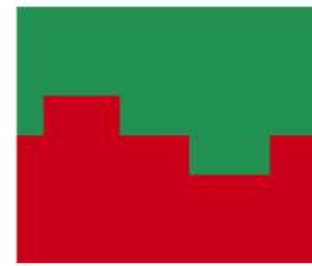
Convex

Relatively small in area

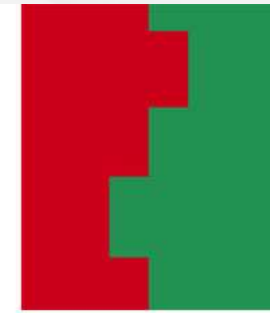
Oriented vertically rather than obliquely

Figure-Ground Segregation

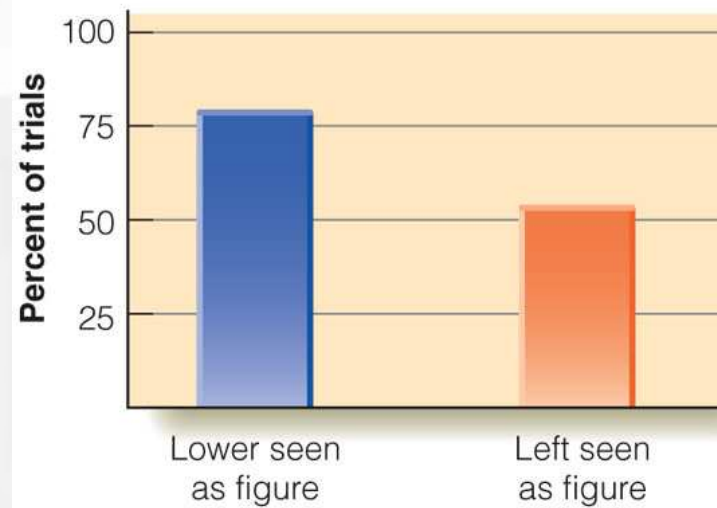
Elements located in the lower part of displays tend to be seen as figure.



(a)

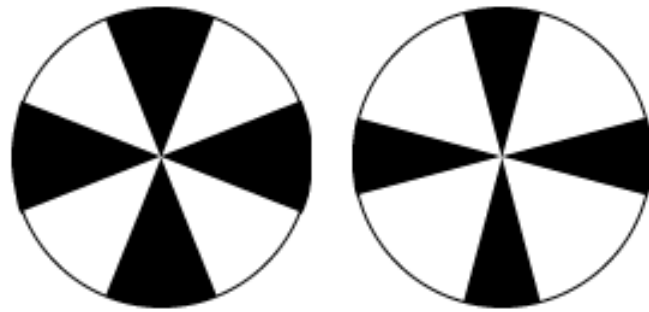


(b)



(c)

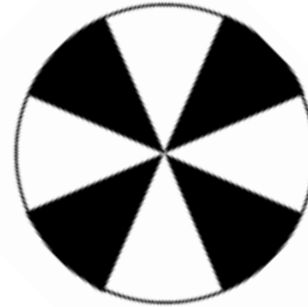
Area



Smaller areas tend to be perceived as figure.

Orientation

Vertical and horizontal components tend to be perceived as figure.



Smaller areas (the black shapes) tend to be perceived as figure.

