

# Fundamentals of Data Science

Data Visualisation



# Designing graphics for the mind

Data Visualisation



# Designing graphics for the mind

Making an effective graphic is easier if we know how the mind works.

As an example, look at this image and count the number of '3's.

1	9	8	3	5	6	4	2	5	3	7	8	4
5	2	3	8	4	6	8	4	7	9	6	1	2
1	2	6	3	4	8	9	6	5	4	2	3	1
9	8	6	3	5	4	8	7	1	3	1	5	5
4	6	8	2	1	3	5	7	9	1	2	3	4
9	8	7	6	5	4	3	2	1	2	3	4	5

# Designing graphics for the mind

Easier to perceive by  
changing things slightly

Shade variations => Easy to  
perceive

Shape variations => Difficult  
to perceive

1	9	8	3	5	6	4	2	5	3	7	8	4
5	2	3	8	4	6	8	4	7	9	6	1	2
1	2	6	3	4	8	9	6	5	4	2	3	1
9	8	6	3	5	4	8	7	1	3	1	5	5
4	6	8	2	1	3	5	7	9	1	2	3	4
9	8	7	6	5	4	3	2	1	2	3	4	5

# Pattern Recognition

According to Gestalt Theory, the brain and visual system follow a number of principles for perceptual organisation

- How the brain groups elements into 'patterns'

This emerged as a school of thought from German psychologies in 1930s/40s

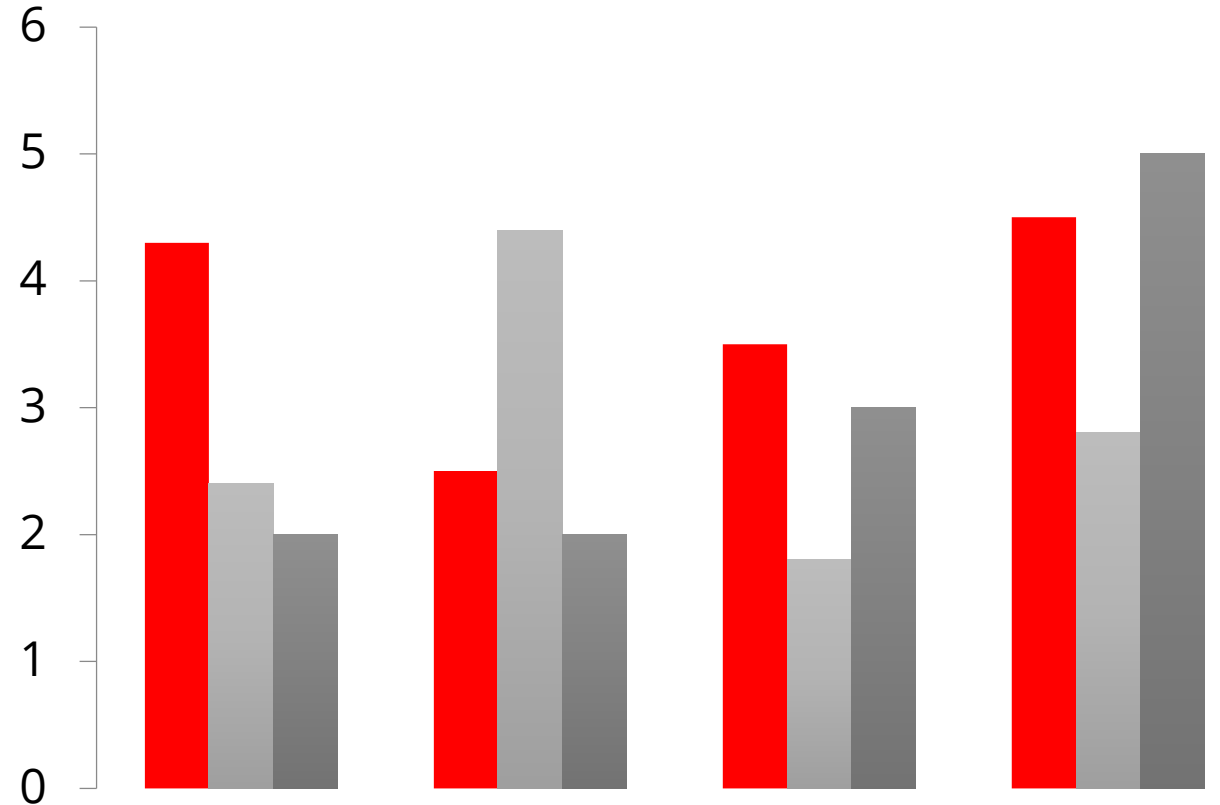
# Gestalt theory: principles of organisation

**Proximity:** objects that are close are perceived to be natural groups



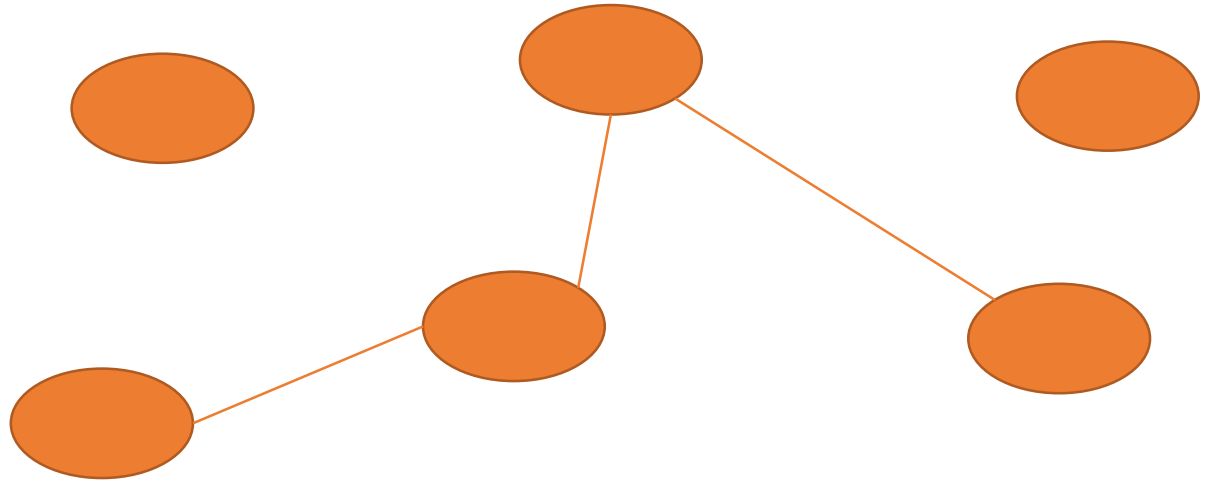
# Gestalt theory: principles of organisation

**Similarity:** identical or similar objects belong to a group



# Gestalt theory: principles of organisation

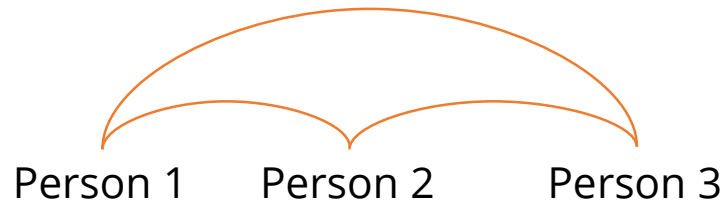
**Connectedness:** linking using a line or similar





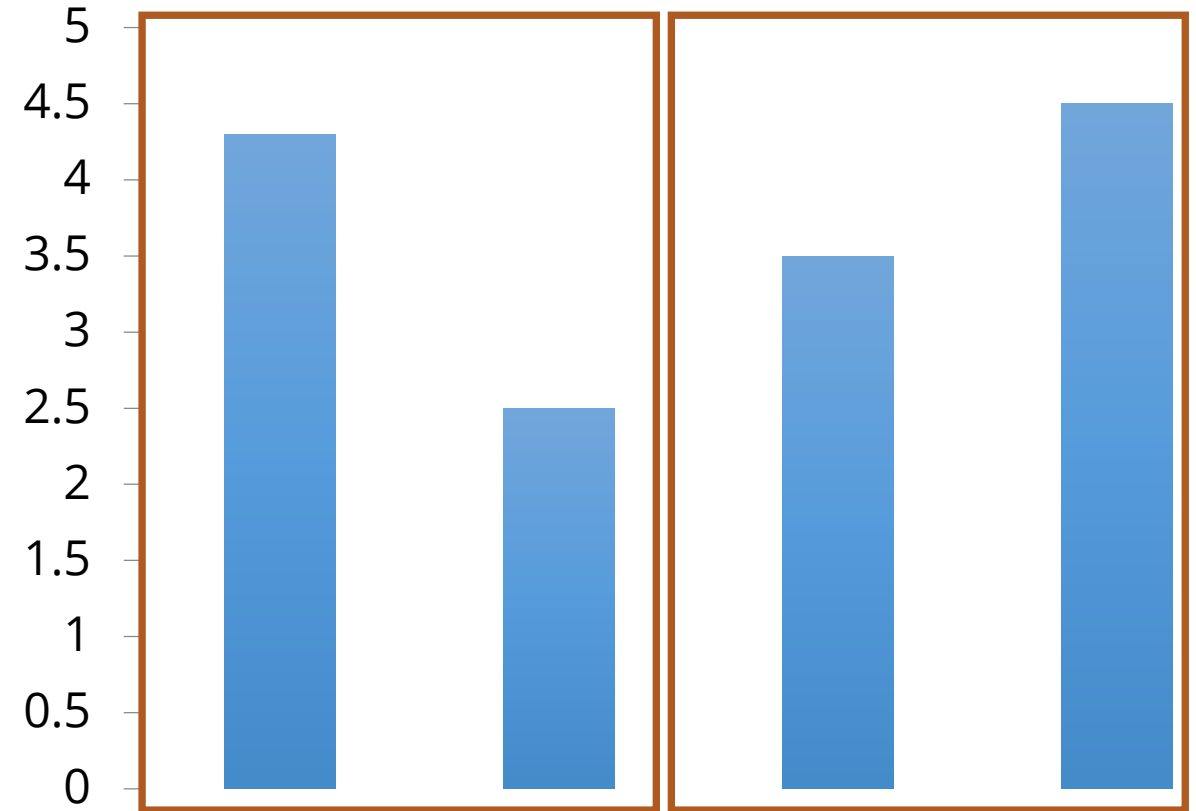
# Gestalt theory: principles of organisation

**Continuity:** smooth contours are easier to perceive than sharp angles



# Gestalt theory: principles of organisation

**Closure:** bounded areas indicate a grouping



# Gestalt theory: takeaway message

- graphics can be made more functional using simple techniques around organisation and layout of components
- conversely, not using Gestalt principles correctly might mislead users as they will make wrong assumptions about the components you display