THE GESTALT PRINCIPLES

VISUAL PROCESSING

Perception is fragmented – eyes are continuously scanning.

Visual thinking seeks patterns

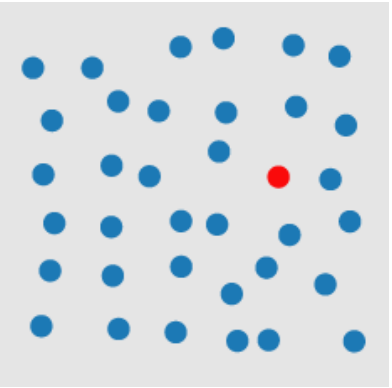
- **Pre-attentive processes:** fast, instinctive, efficient, multitasking gather information and build patterns:

  features → patterns → objects

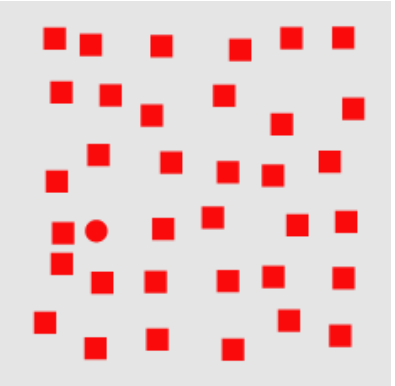
- **Attentive processes:** slow, deliberate, focused discover features in the patterns:

  objects → patterns → features

pre-attentive



attentive



PRE-ATTENTIVE ATTRIBUTES

How many 6's
In the next slide?

2869408609876

9348586748676

2967303986739

3967496749674

2869408609876

9348586748676

2967303986739

3967496749674

2869408609876

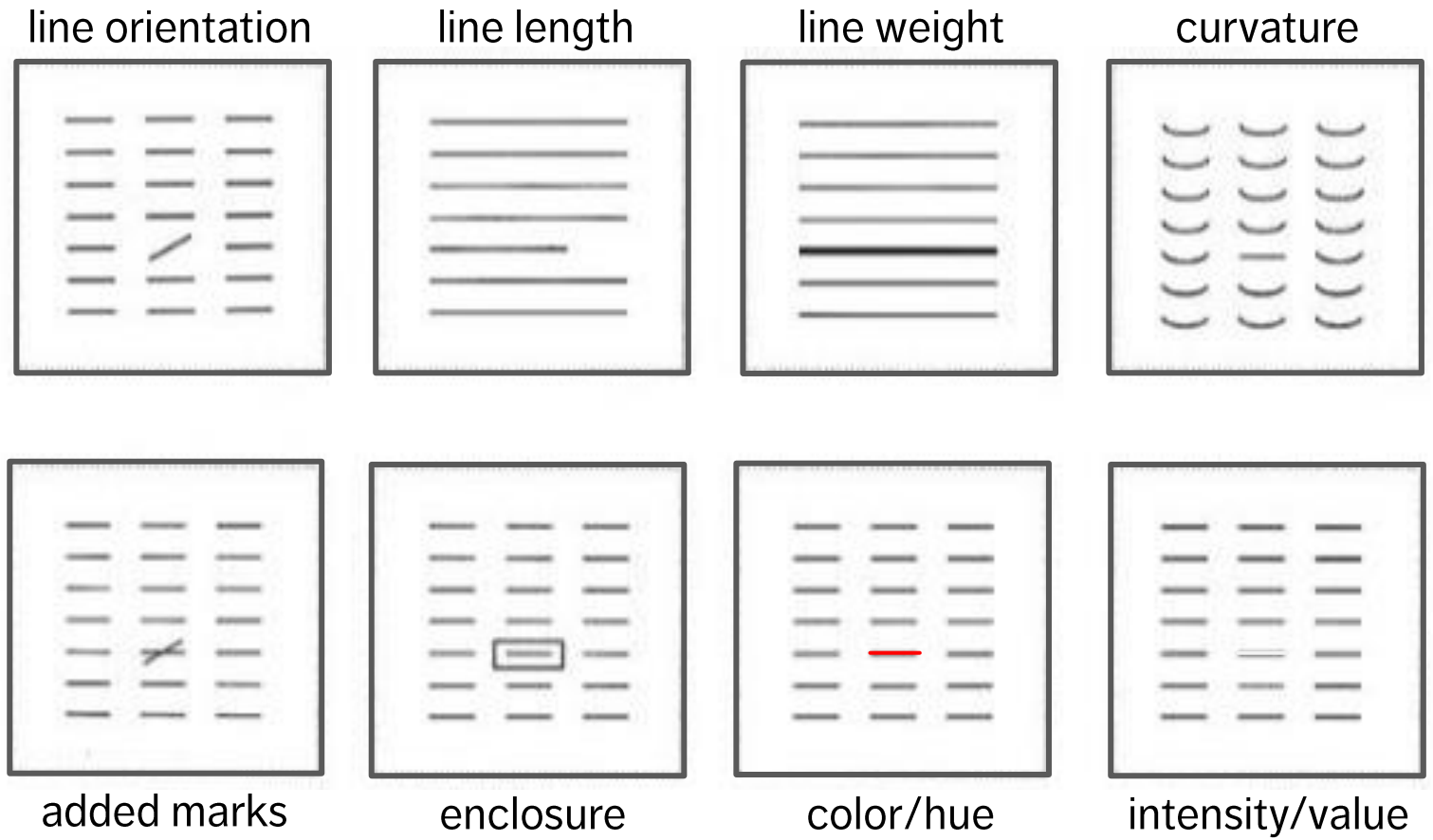
9348586748676

2967303986739

3967496749674

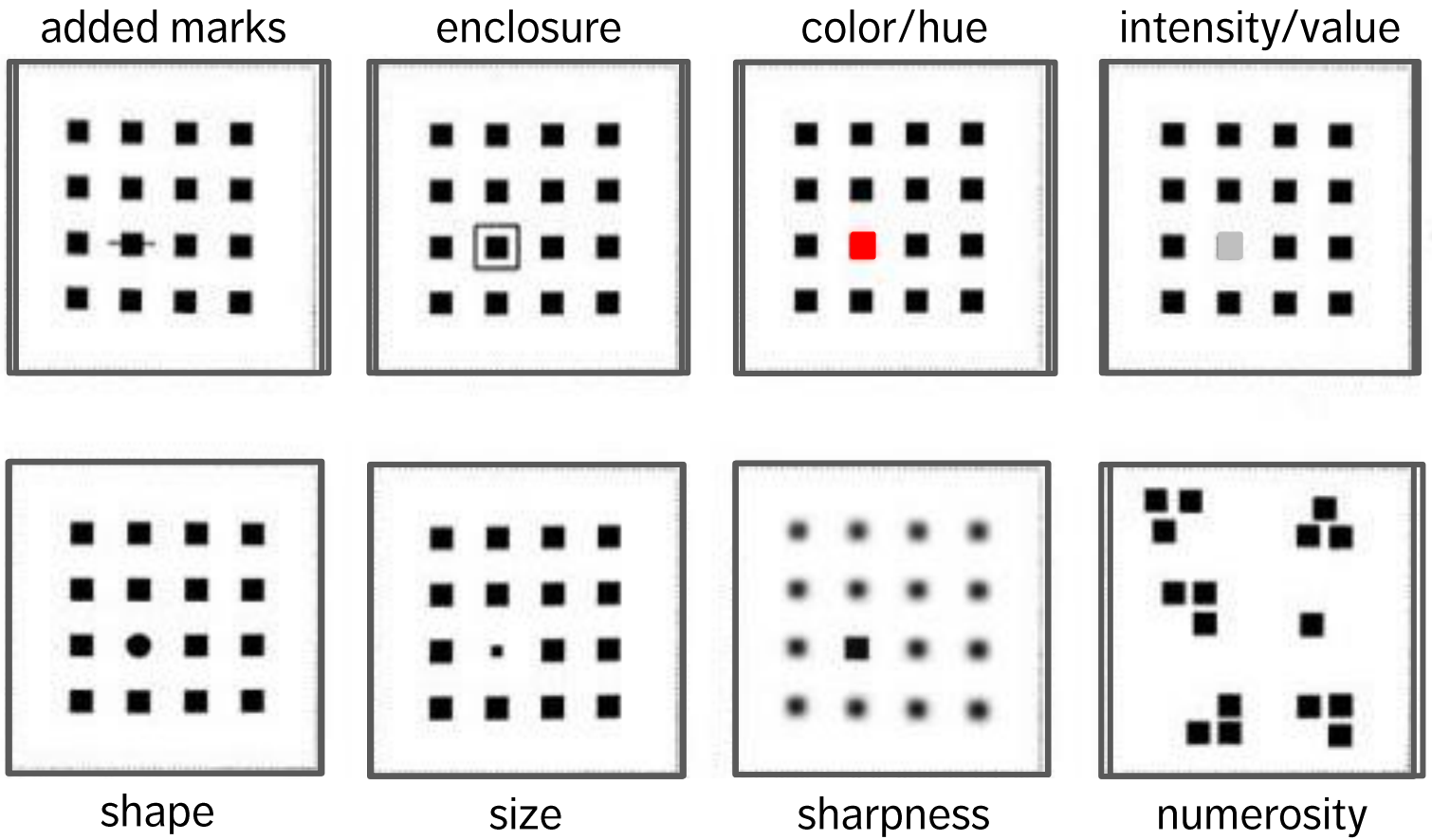
[I. Meirelles, Design for Information]

PRE-ATTENTIVE ATTRIBUTES



[I. Meirelles, Design for Information]

PRE-ATTENTIVE ATTRIBUTES



PRE-ATTENTIVE ATTRIBUTES

Pre-attentive attributes are the domain of iconic memory (brief): they

- help to define a hierarchy of focus
- push non-message impacting components into the background

Use pre-attentive attributes to help **emphasize the story** (but don't overdo them):

- easier to do in Excel and R, harder in Power BI

Challenge: highlighting one aspect of a chart can make other aspects harder to see.

[www.interaction-design.org/literature/topics/gestalt-principles]

GESTALT PRINCIPLES

What are the Gestalt Principles?

- Principles/laws of human perception.
- They describe how humans group similar elements, recognize patterns and simplify complex images when they perceive objects.
- Designers use them to organize content on charts, dashboards, websites, and other interfaces so that they be **aesthetically pleasing** and **easy to understand**.

[www.interaction-design.org/literature/topics/gestalt-principles]

GESTALT PRINCIPLES

Background:

- "Gestalt" is German for "unified whole".
- The first principles were devised in the 1920s by German psychologists Wertheimer, Koffka ("the whole is greater than the sum of the parts") and Kohler
- Their aim: understand how humans gain meaning from the chaotic stimuli around them.
- They identified a set of laws which address the natural compulsion to find order in disorder.
- According to this, the mind "informs" what the eye sees by **perceiving a series of individual elements as a whole**.

GESTALT PRINCIPLES

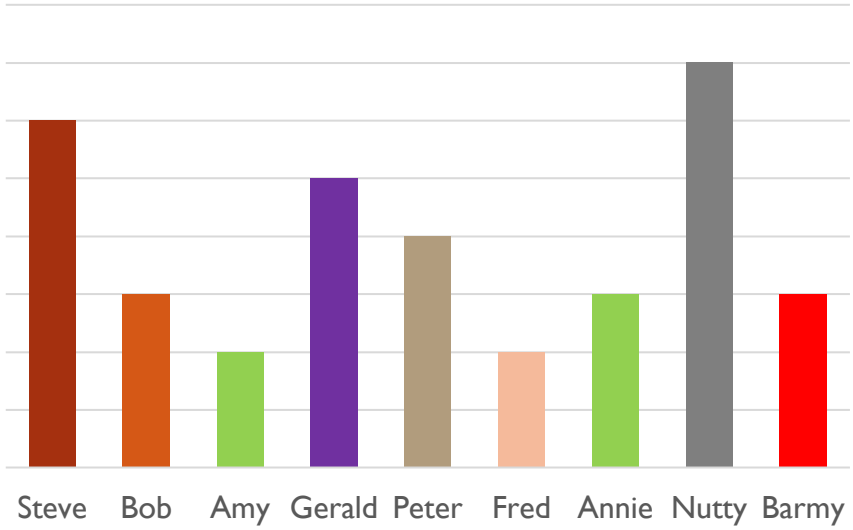
Principles:

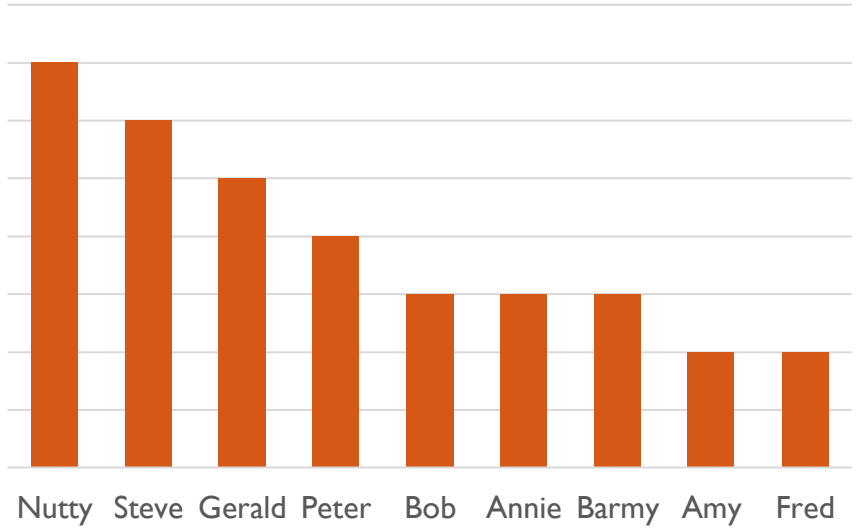
- simplicity
- continuation
- proximity
- similarity (invariance)
- focal point
- isomorphic correspondence
- figure / ground duality
- common fate
- closure*
- uniform connectedness*

SIMPLICITY

The brain has a preference for **simplicity** – it tends to process simple patterns faster than patterns that are more complex.

Lesson: arrange data simply and logically wherever possible.



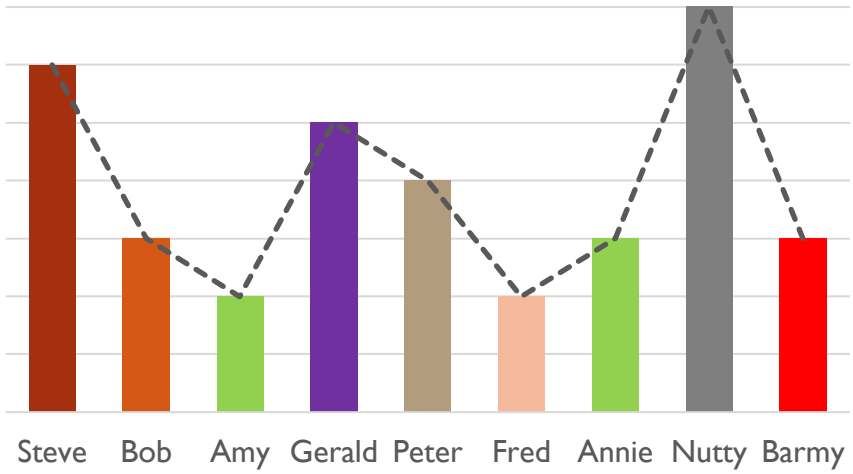


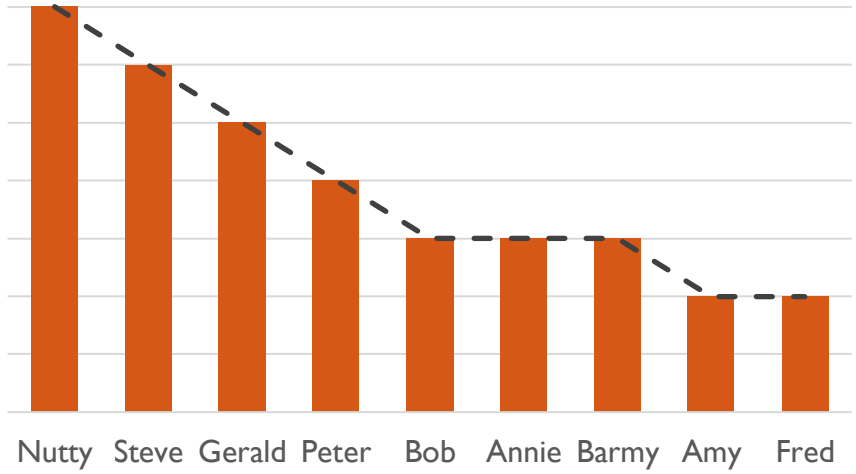
CONTINUATION

Our eyes group things that are **aligned** (e.g. sorted from high to low) with each other.

In the chart on the right the eyes follow a **continuous path**; it makes the whole chart more readable because of the continuous downward direction

Lesson: arrange objects in a line to facilitate grouping and comparison.





PROXIMITY

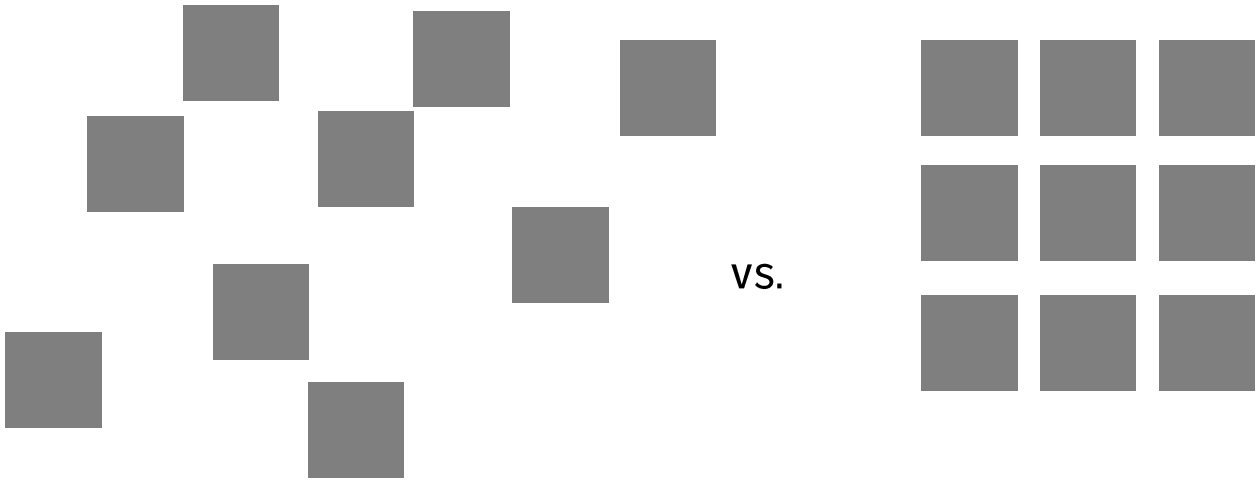
Objects/shapes that are **in proximity** (close) to one another appear to form **groups**.

The effect generated by the collected group is more “powerful” than that generated by separate elements.

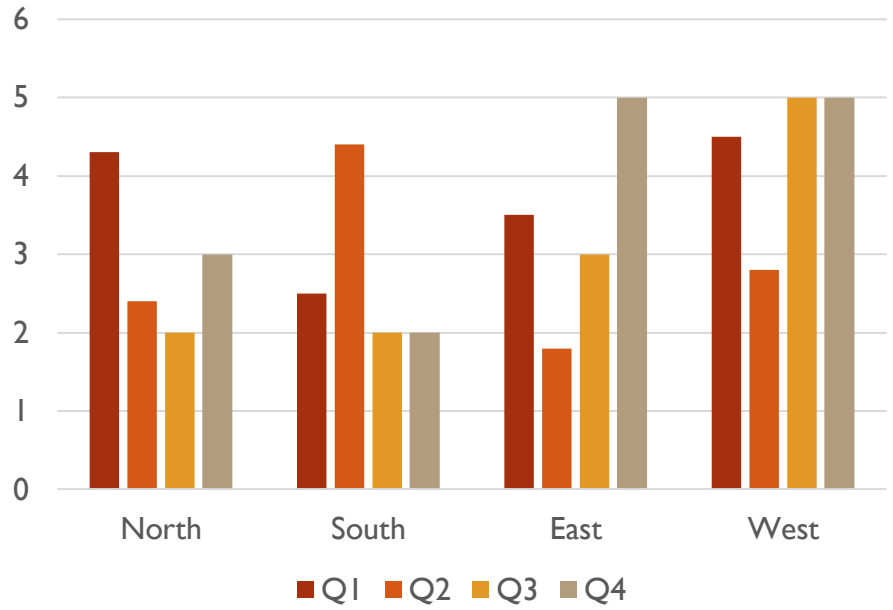
Elements which are grouped together create the **illusion** of shapes/planes in space, even if the elements are not touching.

Lesson: understand the chart’s priorities and create groupings through proximity that support those priorities.

PROXIMITY



vs.



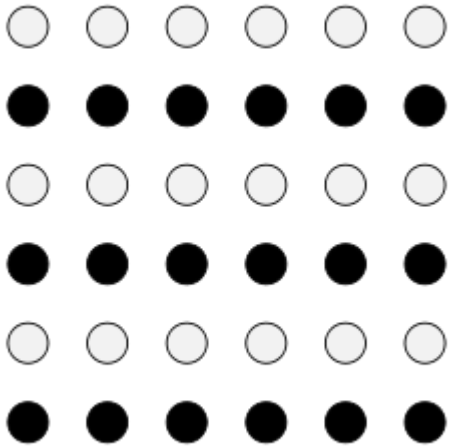
SIMILARITY (INVARIANCE)

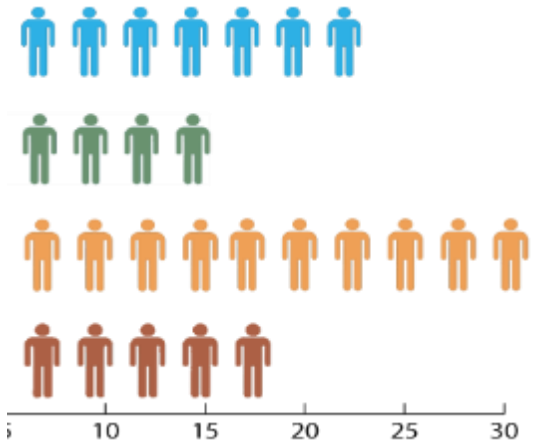
Similarity: stimuli that physically resemble each other are viewed as part of the same object; stimuli that don't are viewed as part of a different object.

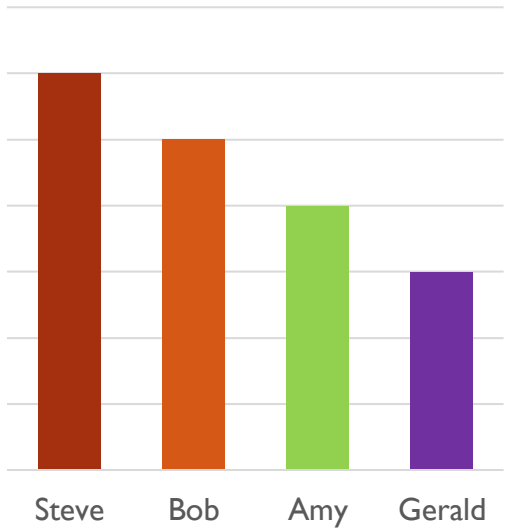
Similarity and proximity often come together to form a **Visual Hierarchy**. Either principle can dominate the other, depending on their application and combination.

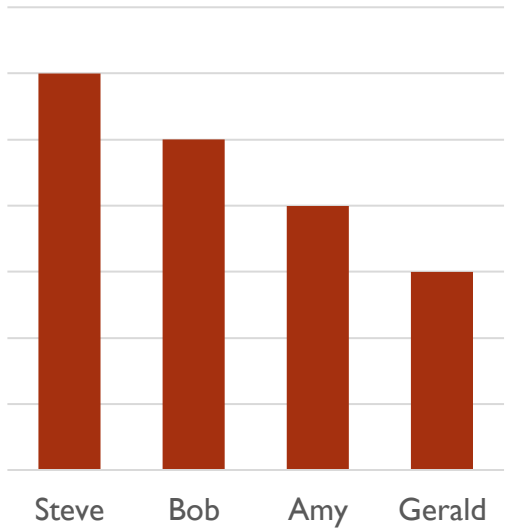
Lesson: use similar characteristics to establish relationships and to encourage groupings of objects.

SIMILARITY (INVARIANCE)









In the examples above, similarity dominates over proximity: we see rows before we see columns.

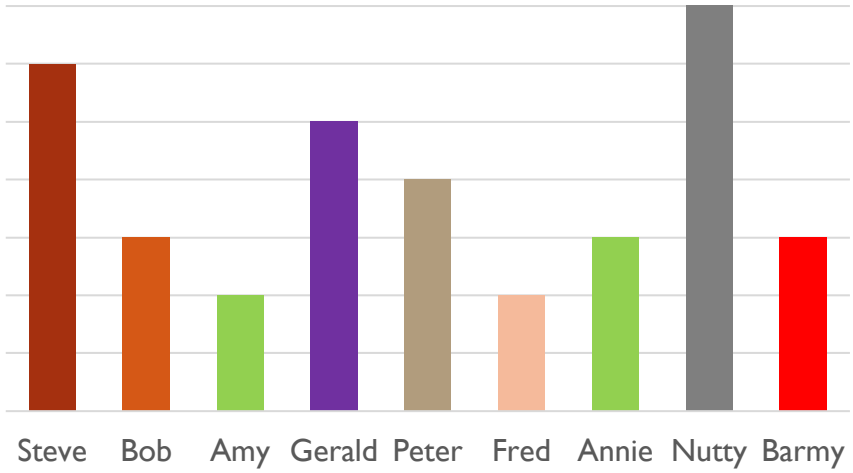
Making things similar can reduce cognitive load (cf. last graph colour).

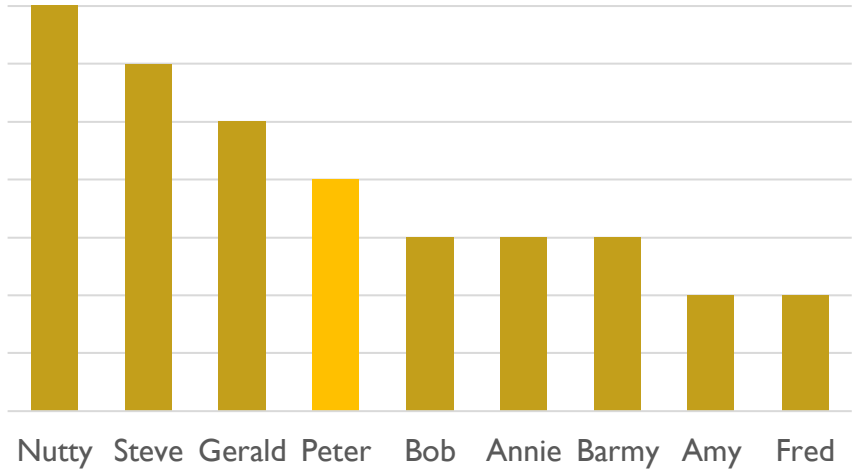
FOCAL POINT

In opposition to similarity, the **focal point** principle states that distinctive-looking objects can create a focal point.

To highlight one salesperson's performance, make their bar graph color different.

Lesson: use different characteristics to highlight and create focal points.





ISOMORPHIC CORRESPONDENCE

People interpret and respond to images based on past/shared experiences (in particular, for the selection of chart colours).

Red is often associated with **bad** and **green** with **good** (colour-blindness?). We can colour-code charts accordingly.

Lesson: stick to well-established conventions and best practices (even if boring!)

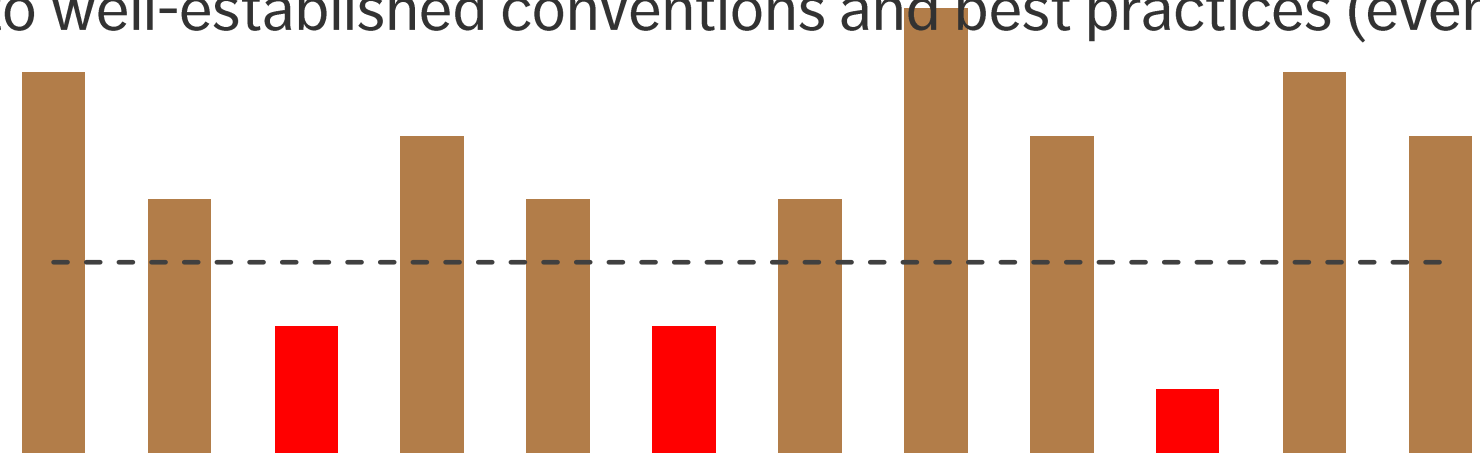


FIGURE / GROUND DUALITY

Chart elements are either perceived as **figures** (focus) or as (back)**ground**.

Foreground objects are **promoted** by the brain, background objects are **demoted**.

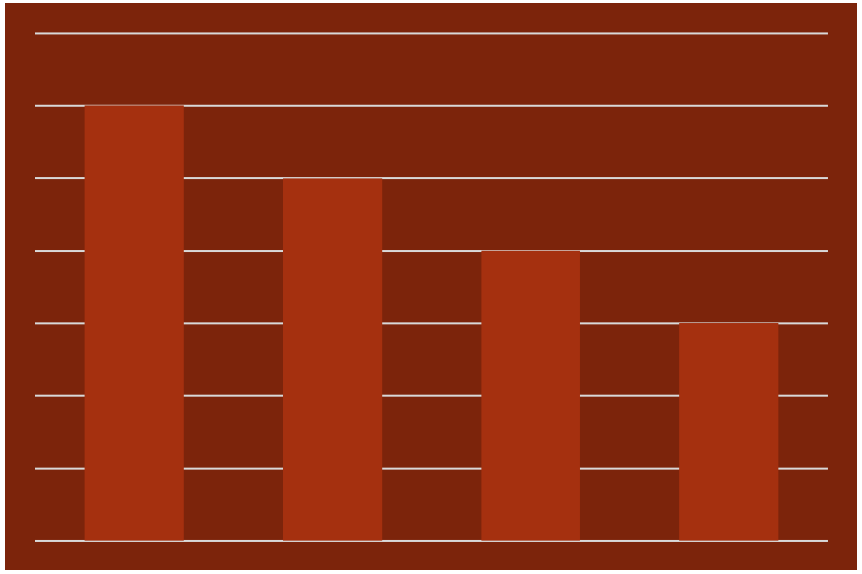
Strong contrast makes it easier to distinguish between the two types of objects.

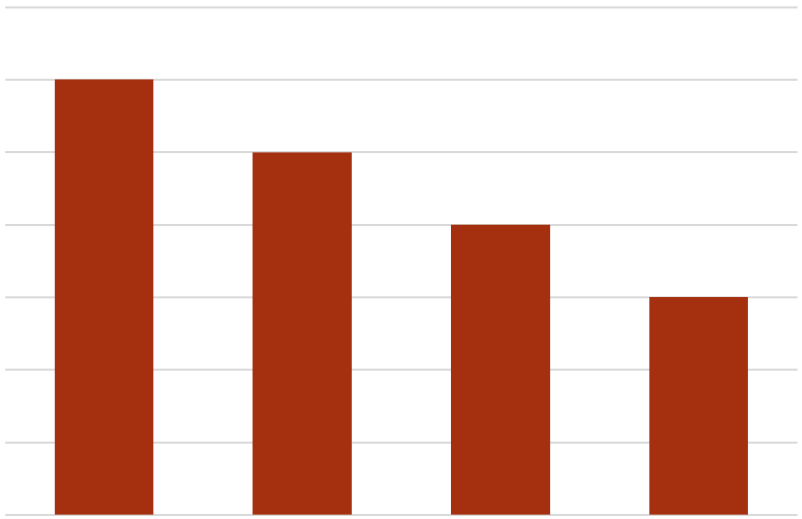
Lesson: ensure there is enough contrast between the chart foreground (figures) and their background.

FIGURE / GROUND DUALITY

Because of the low contrast between the figure and background in the chart on the left, there is an **additional cognitive load**.

Increasing the contrast on the right improves readability.





COMMON FATE

When lines or shapes **come together** (direction, location), a relationship is implied.

Askew lines or shapes are perceived as unrelated or less related.

In the graph “C” seems to belong to a different group than “A” or “B”.

Lesson: use direction and/or movement to establish or negate relationships.