Scatter Plots and Correlation

A scatter plot: one dot per case. Describe direction, form, strength. The correlation coefficient r runs from -1 to 1: sign is direction, size is strength. r only measures fit to a line.

1 THE VOCABULARY
Words we use

Scatter plot many cases, one dot each.

Association a pattern between two quantities: positive (up together) or negative (one up, one down).

Correlation how strongly related in a straight-line way.

r the correlation coefficient, from –1 to 1.

Window roughly the domain and range of the data.

- Watch out for these.
- Reading –0.85 as weaker than 0.60. Strength is the size.
- Thinking r near 0 means no relationship at all. It means no straight-line relationship.
- Reporting an r above 1 or below –1.
- Trusting r without looking at the plot.

2 THE METHOD
Read a scatter plot

1. **WINDOW** what is measured, and between what values.
2. **DIRECTION** up to the right: positive. Down: negative.
3. **FORM** a line or a curve?
4. **STRENGTH** tight or loose around the shape.
5. r sign matches the direction; size near 1 is strong, near 0 is weak.

WHAT R MEASURES
How closely the points fit a line. 1 or –1: every point exactly on a line. 0: no straight-line pattern.

3 READING R
r = 0.97

positive	the quantities go up together
0.97 is close to 1	a very strong relationship
r is about lines	a line fits this data well
r = –0.85 against 0.60	–0.85 is stronger: size, not sign
r = 1.4	impossible: r stays between –1 and 1

MATCH BY TWO LOOKS
First direction (the sign). Then how tight (the size). r = 0.98 is rising and tight; r = –0.17 is falling and very loose.

SAY IT OUT LOUD
Direction, form, strength. The sign of r is the direction and the size is the strength.