How to Interpret a Correlation Coefficient (By Deborah J. Rumsey)

In statistics, the correlation coefficient *ρ* measures the strength and direction of a linear relationship between two variables on a scatterplot. The value of *ρ* is always between +1 and –1. To interpret its value, see which of the following values your correlation *ρ* is closest to. *(Note: there are differences of opinion on what constitutes "strong" vs. "moderate" vs. "weak". This is just one set of opinions.)*

- **Exactly –1.** A perfect negative linear relationship
- **–0.70.** A strong negative linear relationship
- **–0.50.** A moderate negative linear relationship
- **–0.30.** A weak negative linear relationship
- **0.** No linear relationship
- **+0.30.** A weak positive linear relationship
- **+0.50.** A moderate positive linear relationship
- **+0.70.** A strong positive linear relationship
- **Exactly +1.** A perfect positive linear relationship

If the scatterplot doesn't indicate there's at least somewhat of a linear relationship, the correlation doesn't mean much. Why measure the amount of linear relationship if there isn't enough of one to speak of? However, you can take the idea of no linear relationship two ways: 1) If no relationship at all exists, calculating the correlation doesn't make sense because correlation only applies to linear relationships; and 2) If a strong relationship exists but it's not linear, the correlation may be misleading, because in some cases a strong curved relationship exists. That's why it's critical to examine the scatterplot first.
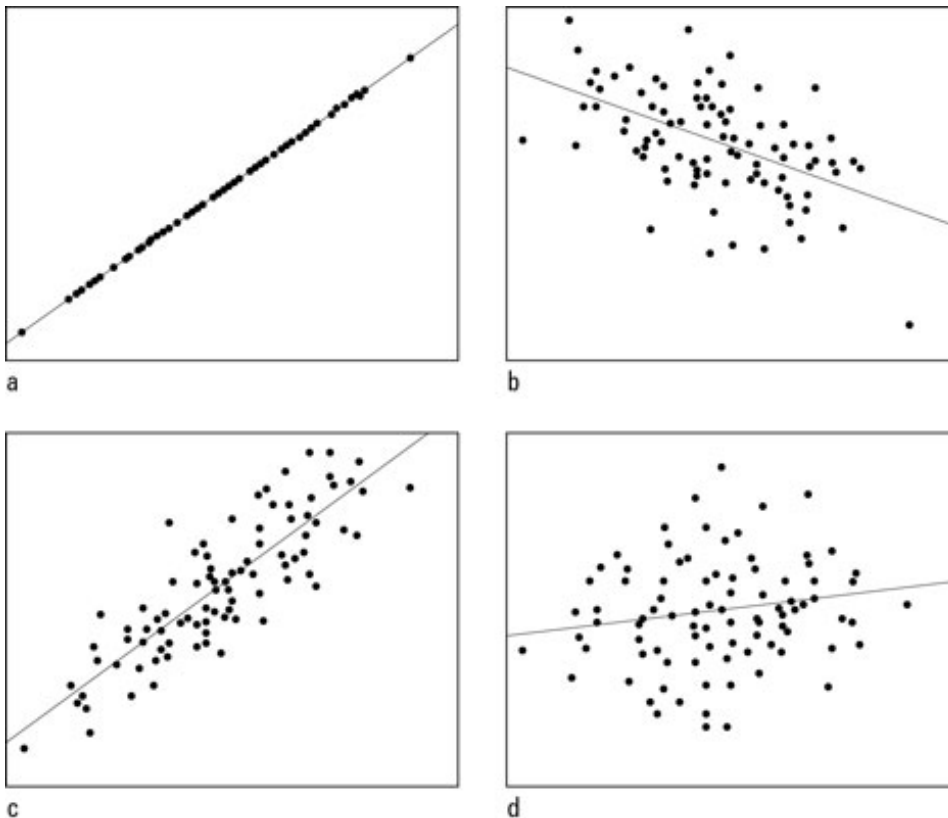
Scatterplots with correlations of a) +1.00; b) –0.50; c) +0.85; and d) +0.15.

The above figure shows examples of what various correlations look like, in terms of the strength and direction of the relationship. Figure (a) shows a correlation of nearly +1, Figure (b) shows a correlation of –0.50, Figure (c) shows a correlation of +0.85, and Figure (d) shows a correlation of +0.15. Comparing Figures (a) and (c), you see Figure (a) is nearly a perfect uphill straight line, and Figure (c) shows a very strong uphill linear pattern (but not as strong as Figure (a)). Figure (b) is going downhill but the points are somewhat scattered in a wider band, showing a linear relationship is present, but not as strong as in Figures (a) and (c). Figure (d) doesn't show much of anything happening (and it shouldn't, since its correlation is very close to 0).