

3. Association. Suppose you were to collect data for each pair of variables. You want to make a scatterplot. Which variable would you use as the explanatory variable, and which as the response variable? Why? What would you expect to see in the scatterplot? Discuss the likely direction, form, and strength.

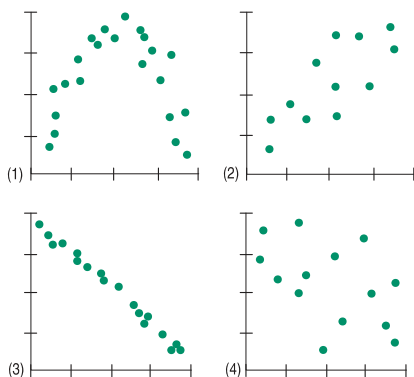
- When climbing a mountain: altitude, temperature
- For each week: ice cream cone sales, air conditioner sales
- People: age, grip strength
- Drivers: blood alcohol level, reaction time

4. Association. Suppose you were to collect data for each pair of variables. You want to make a scatterplot. Which variable would you use as the explanatory variable, and which as the response variable? Why? What would you expect to see in the scatterplot? Discuss the likely direction, form, and strength.

- Long-distance calls: time (minutes), cost
- Lightning strikes: distance from lightning, time delay of the thunder
- A streetlight: its apparent brightness, your distance from it
- Cars: weight of car, age of owner

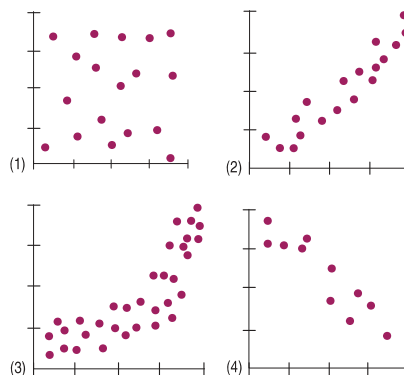
5. Scatterplots. Which of the scatterplots below show

- little or no association?
- a negative association?
- a linear association?
- a moderately strong association?
- a very strong association?

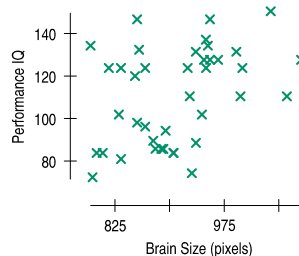


6. Scatterplots. Which of the scatterplots at the top of the next column show

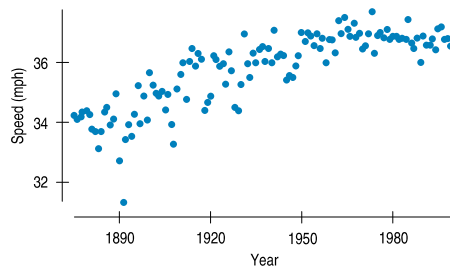
- little or no association?
- a negative association?
- a linear association?
- a moderately strong association?
- a very strong association?



7. Performance IQ scores vs. brain size. A study examined brain size (measured as pixels counted in a digitized magnetic resonance image [MRI] of a cross-section of the brain) and IQ (4 Performance scales of the Weschler IQ test) for college students. The scatterplot shows the Performance IQ scores vs. the brain size. Comment on the association between brain size and IQ as seen in this scatterplot.

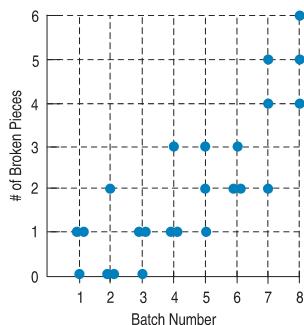


8. Kentucky Derby. The fastest horse in Kentucky Derby history was Secretariat in 1973. The scatterplot shows speed (in miles per hour) of the winning horses each year.

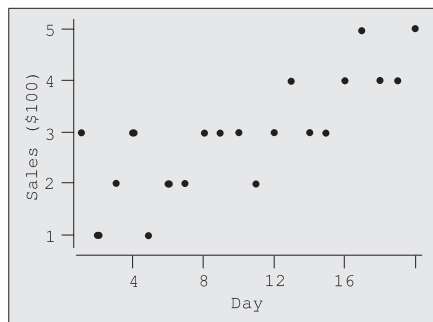


What do you see? In most sporting events, performances have improved and continue to improve, so surely we anticipate a positive direction. But what of the form? Has the performance increased at the same rate throughout the last 125 years?

9. **Firing pottery.** A ceramics factory can fire eight large batches of pottery a day. Sometimes in the process a few of the pieces break. In order to understand the problem better, the factory records the number of broken pieces in each batch for 3 days and then creates the scatterplot shown.

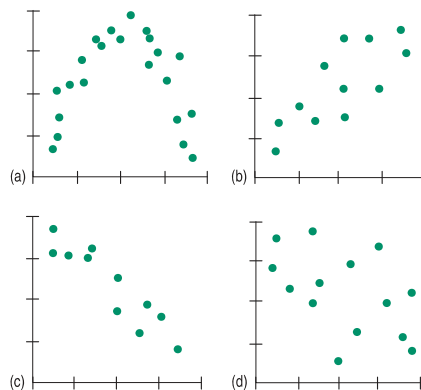


- a) Make a histogram showing the distribution of the number of broken pieces in the 24 batches of pottery examined.
- b) Describe the distribution as shown in the histogram. What feature of the problem is more apparent in the histogram than in the scatterplot?
- c) What aspect of the company's problem is more apparent in the scatterplot?
10. **Coffee sales.** Owners of a new coffee shop tracked sales for the first 20 days, and displayed the data in a scatterplot (by day):



- a) Make a histogram of the daily sales since the shop has been in business.
- b) State one fact that is obvious from the scatterplot, but not from the histogram.
- c) State one fact that is obvious from the histogram, but not from the scatterplot.

11. **Matching.** Here are several scatterplots. The calculated correlations are -0.923 , -0.487 , 0.006 , and 0.777 . Which is which?



12. **Matching.** Here are several scatterplots. The calculated correlations are -0.977 , -0.021 , 0.736 , and 0.951 . Which is which?

