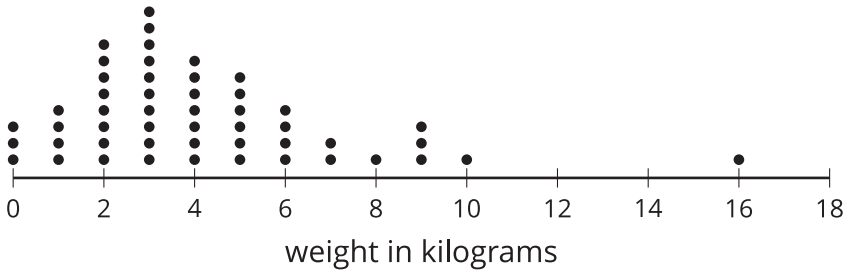
Unit 8, Lesson 5

Using Dot Plots to Answer Statistical Questions

Let's use dot plots to describe distributions and answer questions.

5.1 Packs on Backs

This dot plot shows the weights of backpacks, in kilograms, of 50 sixth-grade students at a school in New Zealand.



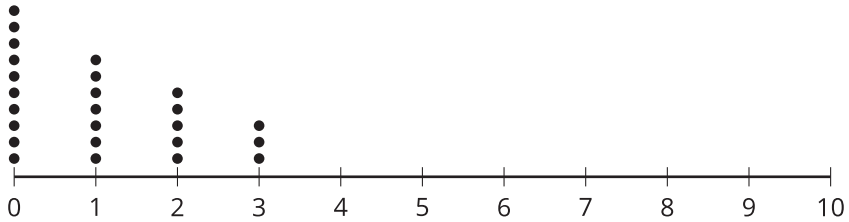
1. The dot plot shows several dots at 0 kilograms. What could a value of 0 mean in this context?

2. Clare and Tyler studied the dot plot.
   - Clare says, "I think we can use 3 kilograms to describe a typical backpack weight of the group because it has the greatest frequency."
   - Tyler disagrees and says, "I think 3 kilograms is too low to describe a typical weight. There are some values much greater than 3 and that should make the typical value greater."

   Do you agree with either of them? Explain your reasoning.

5.2 On the Phone

Twenty-five sixth-grade students were asked to estimate how many hours a week they spend talking on the phone. This dot plot represents their reported number of hours of phone usage per week.

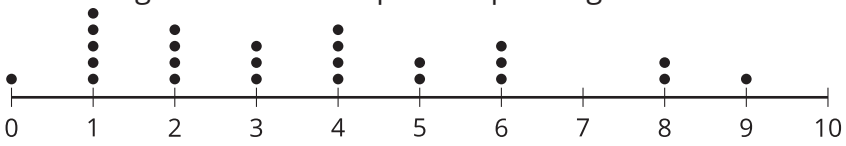


hours on the phone per week

1. What percentage of the students reported not talking on the phone?
2. What percentage of the group reported talking on the phone for 3 hours?
3. How many hours would you say that these 25 students typically spend talking on the phone?

4. a. How would you describe the **spread** of the data? Would you consider these students' amounts of time on the phone to be alike or different? Explain your reasoning.

   b. Here is the dot plot from an earlier activity. It shows the number of hours per week the same group of 25 sixth-grade students reported spending on homework.



hours spent on homework per week

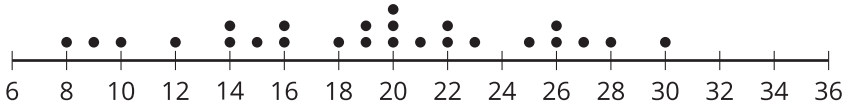
Overall, are these students more alike in the amount of time they spend talking on the phone or in the amount of time they spend on homework? Explain your reasoning.

5.3 Click-Clack

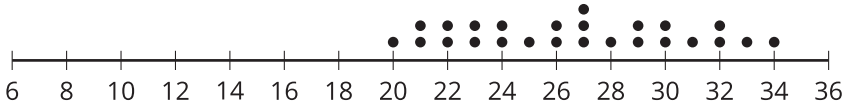
1. A keyboarding teacher wonders: "Do typing speeds of students improve after taking a keyboarding course?" Explain why her question is a statistical question.

2. The teacher records the number of words that her students can type per minute at the beginning of a course and again at the end. The two dot plots show the two data sets.

beginning of course



end of course



Based on the dot plots, do you agree with each of the following statements about this group of students? Be prepared to explain your reasoning.

a. Overall, the students' typing speed does not improve. They type at the same speed at the end of the course as they did at the beginning.

b. 20 words per minute is a good estimate for how fast, in general, the students typed at the beginning of the course because it is near the **center** of the distribution.

c. 20 words per minute is a good description of the center of the data set at the end of the course.

d. There is more variability in the typing speeds at the beginning of the course than at the end, so the students' typing speeds are more alike at the end.

3. Overall, how fast would you say that the students type after completing the course? What would you consider the center of the end-of-course data?

Are you ready for more?

Use one of these suggestions or make up your own. Research to create a dot plot with at least 10 values. Then, describe the center and spread of the distribution.

- Points scored by your favorite sports team in its last 10 games
- Length of your 10 favorite movies (in minutes)
- Ages of your favorite 10 celebrities

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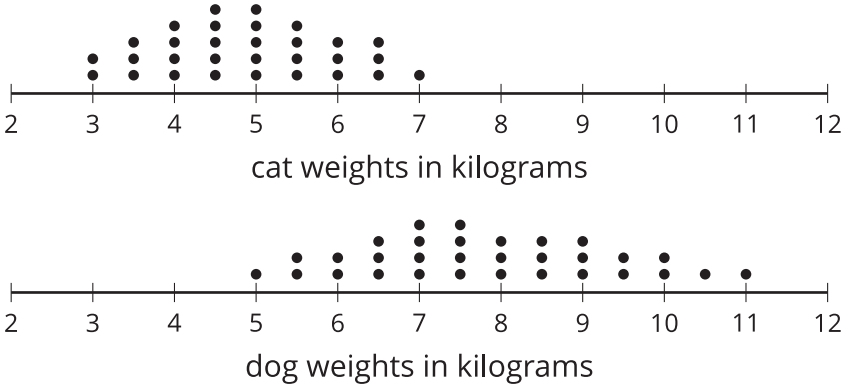
Lesson 5 Summary

One way to describe what is typical or characteristic for a data set is by looking at the **center** and **spread** of its distribution.

Let's compare the distribution of cat weights and dog weights shown on these dot plots.



The collection of points for the cat data is further to the left on the number line than the dog data is. Based on the dot plots, we may describe the center of the distribution for cat weights to be between 4 and 5 kilograms and the center for dog weights to be between 7 and 8 kilograms.

We often say that values at or near the center of a distribution are typical for that group. This means that a weight of 4–5 kilograms is typical for a cat in the data set, and a weight of 7–8 kilograms is typical for a dog.

We also see that the dog weights are more spread out than the cat weights are. The difference between the heaviest and lightest cats is only 4 kilograms, but the difference between the heaviest and lightest dogs is 6 kilograms.

A distribution with greater spread tells us that the data have greater variability. In this case, we could say that the cats are more similar in their weights than the dogs are.

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