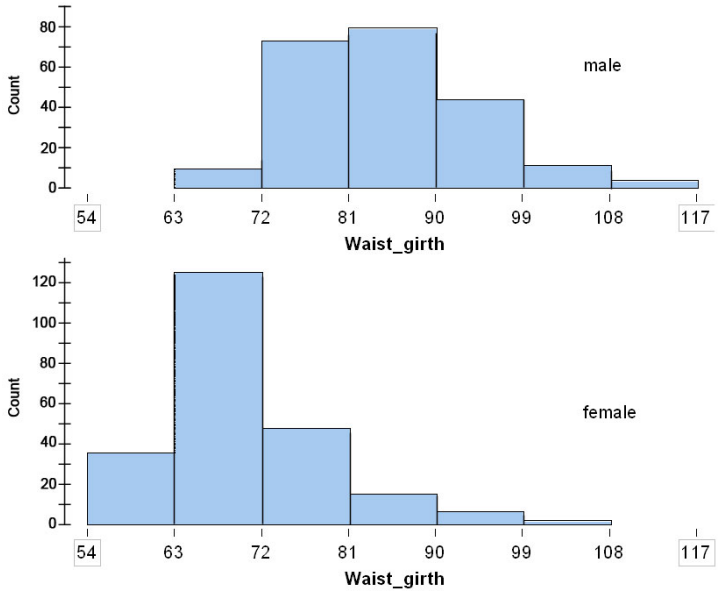
Learning Goal: For the distribution of a quantitative variable, describe the overall pattern (shape, center, and spread) and striking deviations from the pattern.

Specific Learning Objectives:

- Compare and contrast the distributions of a quantitative variable for two groups using histograms. Describe shape, give a general estimate of center and the overall range, and calculate relevant percentages.

1) Here are data from adults (247 men and 260 women) who exercise regularly. The variable is waist girth, measured in centimeters. Indicate whether you think the following statements are valid (true) or invalid (false). Jot down a few notes to explain how the histograms support or contradict each statement.

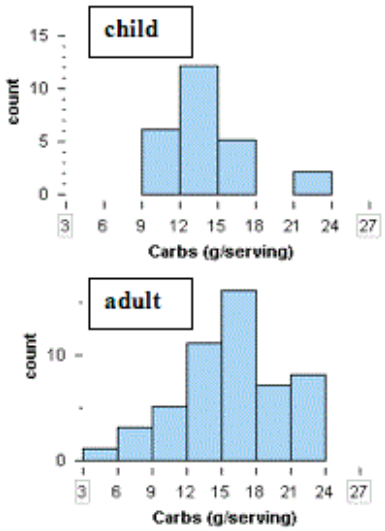


a) In this data set, typical females have a smaller waist girth than typical males.

b) There is less variability in waist girth for females.

c) Here the distributions of waist girth measurements are skewed to the right for both males and females, with only a small percentage of each group having waist girths exceeding 99 cm.

2) These histograms show the distribution of complex carbohydrates (grams per serving) for 76 cereals.

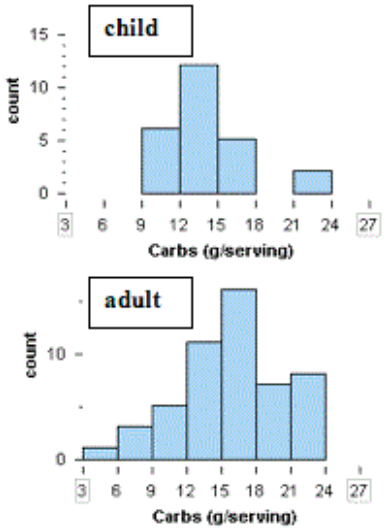


Carbs (g/serving)	Number of Child Cereals	Number of Adult Cereals
3-6	0	1
6-9	0	3
9-12	6	5
12-15	12	11
15-18	5	16
18-21	0	7
21-24	2	8
Totals	25	51

a) How many adult cereals contain 12-15 grams of complex carbs in a serving? How many child cereals contain this amount?

b) Of the adult cereals, what percentage contains 12-15 grams of complex carbs in a serving? Of the child cereals, what percentage contains this amount?

c) Is it better to compare numbers (like in part a) or percentages (like in part b)? Why?



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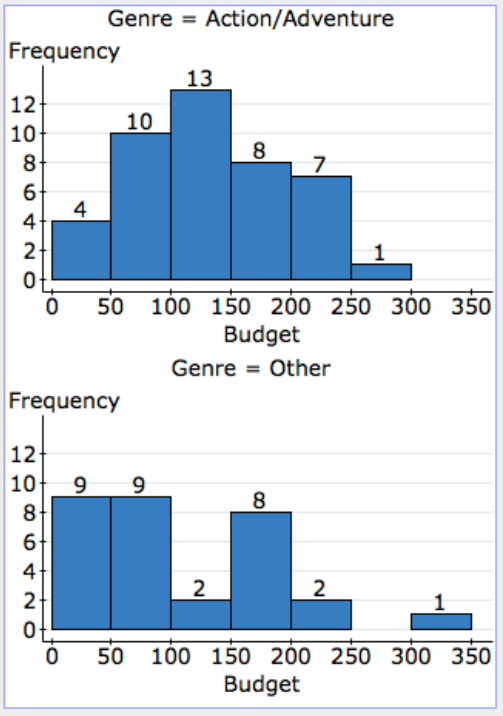
d) The distributions of complex carbs for adult and child cereals overlap quite a bit. This suggests that adult and child cereals have similar amounts of complex carbs in a serving. Use the data to give one piece of precise evidence that supports this statement. Write at least one sentence to explain how your evidence supports this conclusion. (Hint: calculate the percentage within a given interval or give a description of center or spread.)

e) Despite the overlap in the distributions, there are differences. Use the data to give one piece of precise evidence that supports this statement: When compared to child cereals, adult cereals tend to have a larger amount of complex carbs in a serving. Write at least one sentence to explain how your evidence supports this conclusion.

3) These histograms show the budget in millions of dollars for a sample of 74 movies listed in the top 100 USA box office sales of all time. The movies are divided into two genres: Action/Adventure (with 43 movies) and Other (with 31 movies).



a) Describe the shape of each distribution. What does the shape tell us about where most of the data fall?

b) Which genre (Action/Adventure or Other) has the movie with the largest budget?

c) When we take all of the data into account, which genre tends to have larger budgets? (To answer this question, give an interval that represents typical budget amounts for each genre. Use these intervals to support your answer.)

d) Which genre has more variability in budget amounts? (To answer this question, estimate the overall range of budget amounts for each genre. Use your estimates to support your answer.)

e) Pick the statement that you think is most strongly supported by the data:

- Action/Adventure movies tend to have larger budgets than other movies.

- Budget amounts are similar for Action/Adventure movies and other movies.

For the statement you picked, support it with <u>at least three</u> precise observations from the histograms. Explain how your observations support the statement you chose.