

Matching Graphs to Variables

SCENARIO

Some people earn a lot of money each year, so there are some families with very large incomes relative to the rest of the population. Thus, if we were to collect family income data from a sample of Americans and then construct a histogram, we would expect the histogram to be skewed to the right. If we think about the type of data we would be likely to obtain, we can say something about the shape of the histogram without actually collecting the data. Can we do the same with other variables?

Question

Can we deduce the likely shape of the histogram of each of several variables?

Objectives

The purpose of this activity is to learn how features of distributions are related to graphs of the data. After completing this activity, you should be able to sketch the shape of the histogram for a variable by thinking about the nature of the data.

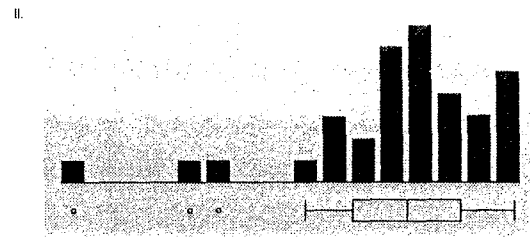
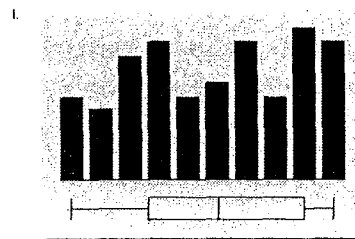


Activity

1. Warm-up
 - Consider the following two variables:
 - A. age at death of a sample of 34 persons;

B. the last digit in the social security number of each of 40 students.

We wish to match these variables to their graphs:



We know that there are relatively few deaths among young people; the death rate rises with age. Thus, we would expect the histogram of the age at death data to be skewed to the left, with most of the observations being in a large group toward the right of the graph. We expect the histogram to have a small left-hand tail. Hence, we match A with II. On the other hand, the social security data should have a distribution that is close to uniform on the integers 0, 1, . . . , 9. Thus, we match B with I.

2. Main activity

- Consider the following list of variables and graphs:
- a. scores on a fairly easy examination in statistics;
 - b. number of menstrual cycles required to achieve pregnancy for a sample of women who attempted to get pregnant. Note that these data were self-reported

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- from memory. (Data from S. Harlap and H. Baras (1984), "Conception—waits in fertile women after stopping oral contraceptives," *Int. J. Fertility*, 29:73–80.)
- c. heights of a group of college students;
- d. numbers of medals won by countries in the 1992 Winter Olympics;
- e. SAT scores for a group of college students.

