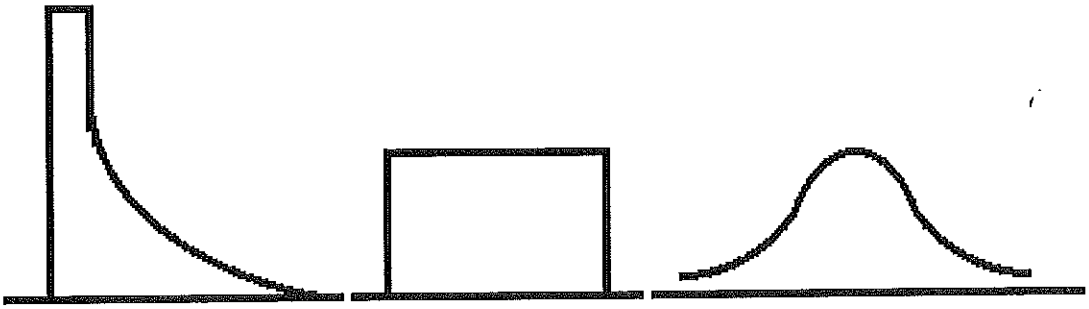
LAB 7
Exploring Data with Summary Statistics

Sometimes the salient features of a histogram can be summarized by a few statistics such as the mean (or average), the median, the standard deviation, or the five-number summary. These quantities allow us to make comparisons of groups and help us to understand the story behind the data.

AT THE COMPUTER

Let's examine how these quantities relate to the histogram that they summarize using data that was gathered in September of 1999 when students responded to a survey in a large statistics class. Use your software to open the data file called 'Au99survey'.

1. Three of the variables in the survey were birthday month (1 for January, 2 for February, etc.), the amount spent on textbooks (in dollars), and the number of sodas consumed over the previous week. Without looking at histograms of the data, guess which of the three rough sketches below will approximately describe the histograms of the three variables. Explain your guesses.



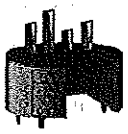
2. Create the histograms for each of these three variables. How do the histograms compare with what you expected?

3. Look at the three histograms for birthday month, textbook costs, and sodas consumed. Guess the value of the median, the mean, and the standard deviation for each variable.

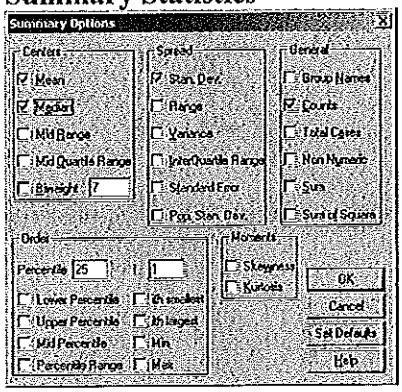
Variable	My guess at the median	My guess at the mean	My guess at the standard deviation
month			
textbooks			
sodas			

To see how well you did at judging the descriptive statistics in question 3, use your software to compute the actual values.

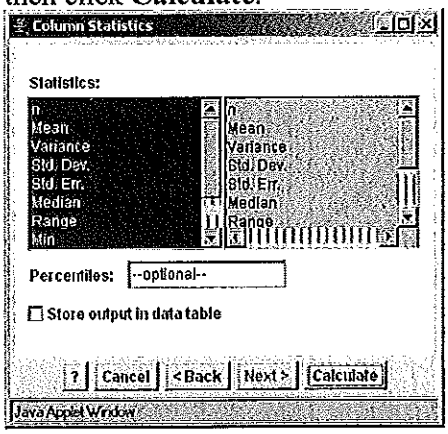
Software Tip: Summary Statistics



In Data Desk select the variable of interest and then choose **Calc>Summaries>Reports.** You may choose which summary statistics to produce by choosing **Calc>Calculation Options>Select Summary Statistics**



CrunchIt! In CrunchIt click **Stat>Summary Stats>Columns.** Choose the variables of interest and click **Next**. You can choose the statistics you wish from the list and then click **Calculate**.



4. What are the actual values for the median, mean, and standard deviation of the three variables?

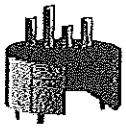
Variable	Actual median	Actual mean	Actual standard deviation
month			
textbooks			
sodas			

5. Compare the actual values with your guesses. Which variable's summary statistics were most difficult to judge? Explain.

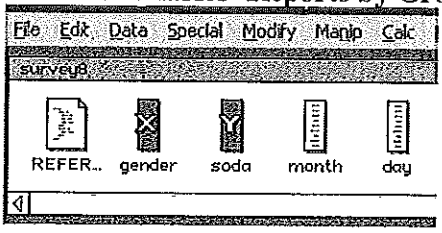
6. Which measure of location (mean or median) would be the most appropriate in each of the following situations? Explain.
   a. You want to know how many sodas a typical student in the class drinks per week.

   b. You want to know how much soda is consumed in a week by the class as a whole.

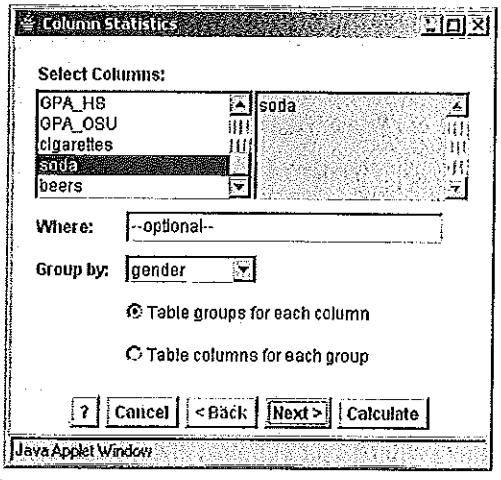
Software Tip: Summary Statistic by Groups



In Data Desk select the variable of interest (place the Y on this variable). To select the grouping variable hold the shift key while selecting the variable (an X will be placed on the variable. Choose **Calc>Summaries>Reports by Group.**



CrunchIt! In CrunchIt click **Stat>Summary Stats>Columns.** Choose the variables of interest. In the "Group by:" box choose the grouping variable.



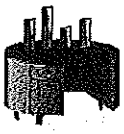
7. Do males drink more soda than females? One of the big advantages of summary statistics is that they allow us to compare groups such as males and females. Record the following summary statistics for the number of soda's consumed by males and females.

Gender	Mean	Median	1st Quartile	3rd Quartile	Min	Max
Males						
Females						

8. Based on your summary statistics, do you feel males or females drink more soda?

9. Boxplots are useful for making a graphical comparison between groups in a population. Use Boxplots to compare the High School GPA for the men and women in the class. Sketch the comparative Boxplots below.

Software Tip: Comparative Boxplots



In Data Desk select the variable of interest (place the Y on this variable). To select the grouping variable hold the shift key while selecting the variable (an X will be placed on the variable. Choose **Plot>Boxplot y by x.**

CrunchIt! In CrunchIt click **Graphics>Boxplot.** Choose the variables of interest. In the "Group by:" box choose the grouping variable. Select **Next** and click **Use fences to identify outliers.**