Exploring Statistics Using Fathom Graphical Displays of Data

The Setting

Consider the data given in the Fathom file, ${\tt PulseRatesBeforeAfterExercise.ftm},$ available at

http://paws.wcu.edu/emcnelis/StatsExamples.html.

The data, and the experiment explanation given below, were taken from the OzDASL (Australian Data and Story Library) found at http://www.statsci.org/data/.

Students in an introductory statistics class (MS212 taught by Professor John Eccleston and Dr. Richard Wilson at The University of Queensland) participated in a simple experiment. The students took their own pulse rate. They were then asked to flip a coin. If the coin came up heads, they were to run in place for one minute. Otherwise they sat for one minute. Then everyone took their pulse again. The pulse rates and other physiological and lifestyle data are given in the data.

Five class groups between 1993 and 1998 participated in the experiment. The lecturer, Richard Wilson, was concerned that some students would choose the less strenuous option of sitting rather than running even if their coin came up heads, so in the years 1995-1998 a different method of random assignment was used. In these years, data forms were handed out to the class before the experiment. The forms were pre-assigned to either running or non-running and there were an equal number of each. In 1995 and 1998 not all of the forms were returned so the numbers running and sitting was still not entirely controlled.

Variable	Description
Height	Height (cm)
Weight	Weight (kg)
Age	Age (years)
Gender	Sex
Smokes	Regular smoker?
Alcohol	Regular drinker?
Exercise	Frequency of exercise
$\operatorname{Ran}/\operatorname{Sat}$	Whether the student ran or sat between the
	first and second pulse measurements
Pulse1	First pulse measurement (rate per minute)
Pulse2	Second pulse measurement (rate per minute)
Year	Year of class (93 - 98)

See back for project assignment.

Project Assignment

First, you are to make some hypothesis that you believe you can reasonably support with graphical representations of this data. Then, you must write a short report that sways the reader to agree with your hypothesis, supporting your argument with carefully selected graphical displays (i.e. bar chart, frequency distributions, pie charts, dot plots, and histograms) of the data. Note, you are encouraged to create new attributes from the original attributes if that will support your hypothesis.

In your report, you must make use of all six types of displays listed below, and at least one of them must be COMPARATIVE

- 1. Bar chart
- 2. Frequency Distribution
 - (a) For categorical data
 - (b) For numerical data (EXCLUDING the AGE and YEAR attributes for this one)
- 3. Dot plots
- 4. Histogram
- 5. Scatterplot
- 6. Box Plot

Your report is to be typed in Microsoft Word or using a similar word processing software. Images and tables of your graphical displays are to be included in this document, either within the body, or in an appendix.