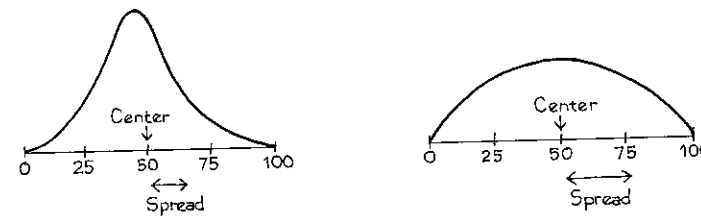
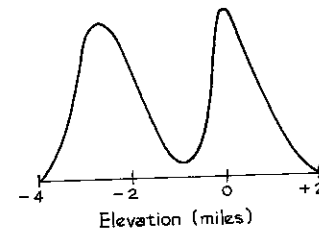


Figure 1. Center and spread. The centers of the two histograms are the same, but the second histogram is more spread out.



is shown along the horizontal axis, in miles above (+) or below (-) sea level. The area under the histogram between two elevations gives the percentage of the earth's surface area between those elevations. There are clear peaks in this histogram. Most of the surface area is taken up by the sea floors, around 3 miles below sea level; or the continental plains, around sea level. Reporting only the center and spread of this histogram would miss the two peaks.³

Figure 2. Distribution of the surface area of the earth by elevation above (+) or below (-) sea level.



2. THE AVERAGE

The object of this section is to review the average; the difference between *cross-sectional* and *longitudinal* surveys will also be discussed. The context is HANES—the Health and Nutrition Examination Survey of 1976–80, in which the Public Health Service examined a representative cross section of 20,322 Americans age 1 to 74. The objective was to get baseline data about—

- demographic variables, like age, education, and income;
- physiological variables like height, weight, blood pressure, and serum cholesterol levels;
- dietary habits;
- levels of lead and pesticides in the blood;
- prevalence of diseases.

Subsequent analysis focused on the interrelationships among the variables, and had major impacts on health policy. For example, HANES data showed a 37% decline in blood levels of lead over the survey period. The Public Health Service

identified the cause—increasing use of unleaded gasoline. A ban on lead additives followed.⁴

The point here is just to take a quick look at the sample, reviewing the idea of the average.

The average of a list of numbers equals their sum, divided by how many there are.

For instance, the list 9, 1, 2, 2, 0 has 5 entries, the first being 9, and its average is

$$\frac{9 + 1 + 2 + 2 + 0}{5} = \frac{14}{5} = 2.8$$

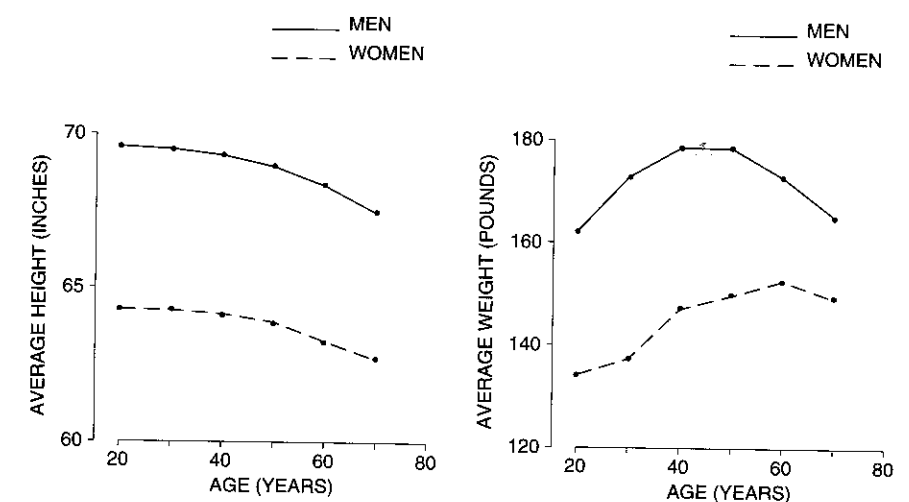
What did the men and women in the sample (age 18–74) look like?

- The average height of the men was 5 feet 9 inches, and their average weight was 171 pounds.
- The average height of the women was 5 feet 3.5 inches, and their average weight was 146 pounds.

They're pretty chubby.

How are height and weight related to age? Figure 3 shows average heights and weights separately for the men and women in the different age groups studied by the Public Health Service; these averages are joined by straight lines in the graph. The average is a powerful way of summarizing data—many histograms

Figure 3. Age-specific average heights and weights for men and women 18–74 in the HANES sample. The panel on the left shows height, the panel on the right shows weight.



Source: Data tape supplied by the Inter-University Consortium for Political and Social Research.

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