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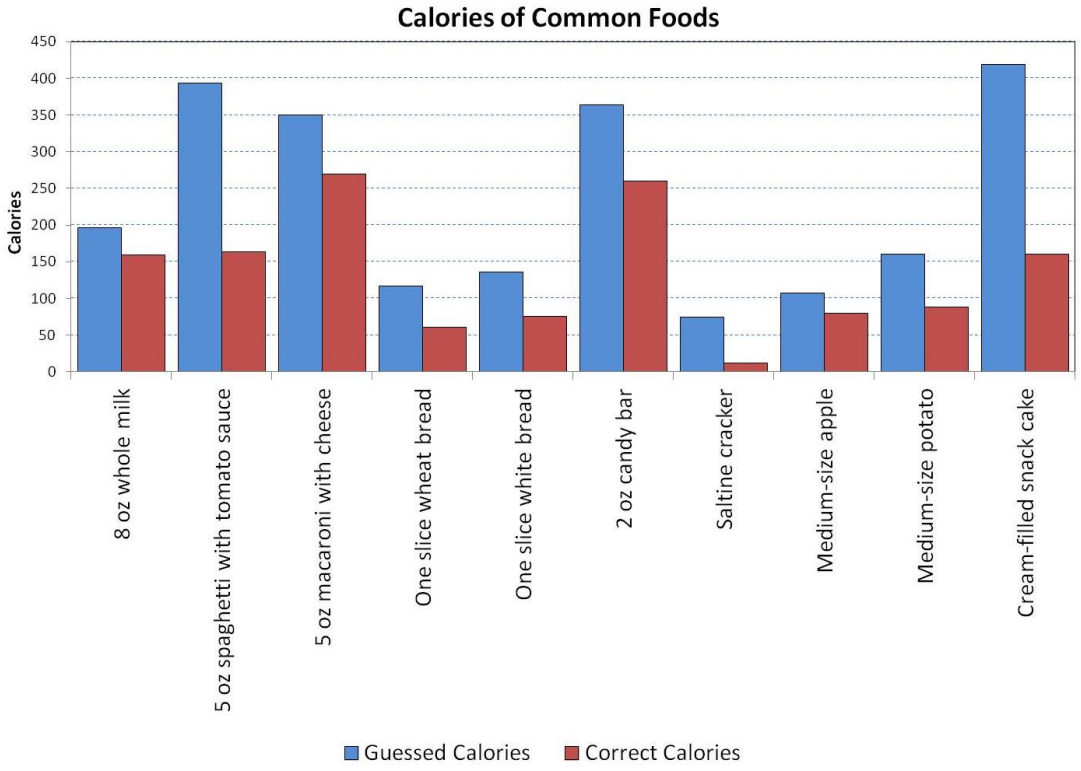
Pre-Activity Test Answer Key

1. A food industry group asked 3,368 people to guess the number of calories in each of several common foods. The table below provides average of their guesses and the correct number of calories:

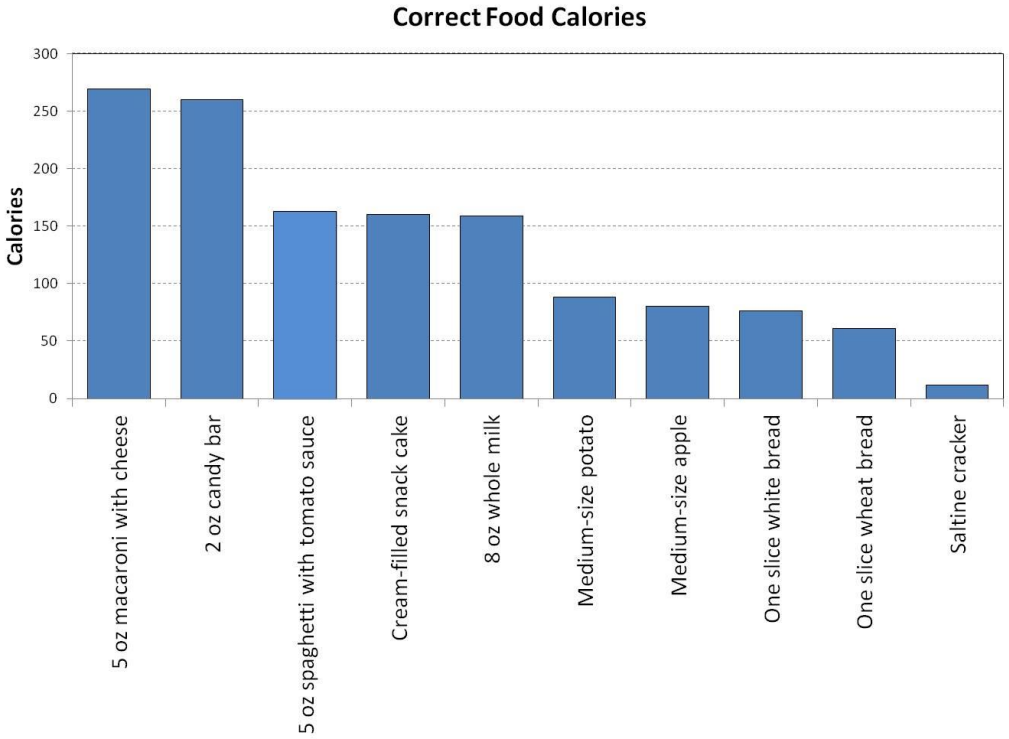
Food	Guessed Calories	Actual Calories
8 oz. whole milk	196	159
5 oz. spaghetti with tomato sauce	394	163
5 oz. macaroni with cheese	350	269
1 slice wheat bread	117	61
1 slice white bread	136	76
2 oz. candy bar	364	260
1 saltine cracker	74	12
1 medium-size apple	107	80
1 medium-size potato	160	88
1 cream-filled snack cake	419	160

   a. Make a clustered bar graph using the data in the table. Was the estimation over or under?



Answer: The guessed values by the surveyed people were all more than the real values, that is, they were overestimated.

b. Use a Pareto chart to determine the two foods with the highest calories content.



Answer: The two foods in the above table with the highest caloric content are the macaroni with cheese and the candy bar.

2. Three groups of *AP Statistics* students were asked how many minutes they studied on typical weeknight. The responses of random samples of 30 female and 30 male students are in the table.

Girls					Boys				
180	120	180	360	240	90	120	30	90	200
120	180	120	240	170	90	45	30	120	75
150	120	180	180	150	150	120	60	240	300
200	150	180	150	180	240	60	120	60	30
120	60	120	180	180	30	230	120	95	150
90	240	180	115	120	0	200	120	120	180

For each of the above data sets compute:

a. The sample mean
b. The standard deviation, and the coefficient of variation
c. The five-number summary
d. The 10% trimmed mean

Using modified box-and-whisker plots, compare the above data. Include the mean values on your graphs. Draw conclusions about the study habits of the *AP Statistics* students.

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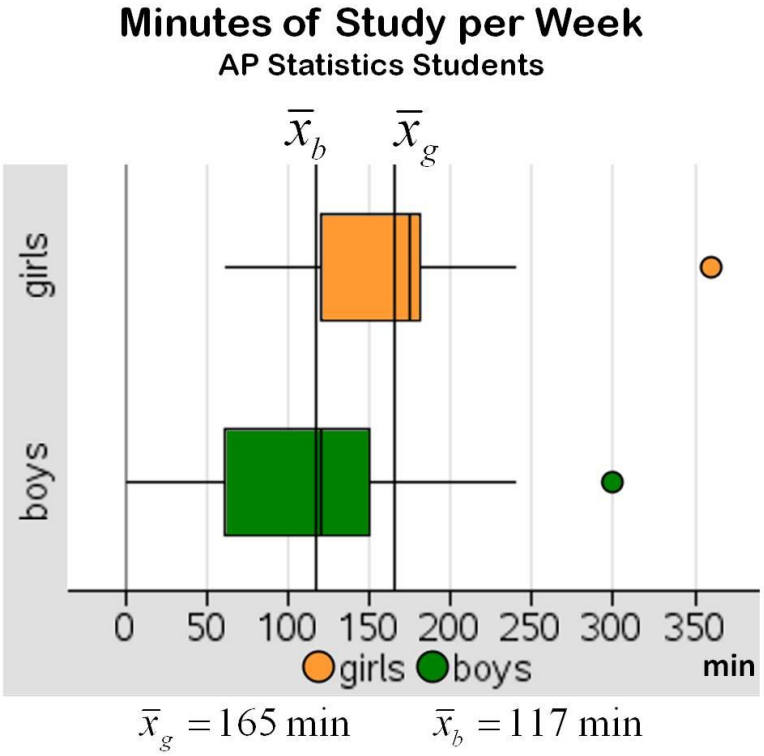
Statistics		Girls	Boys	Differences
Sample mean:	$\bar{x} =$	165.167	117.167	48
Sample std. dev:	$S_x =$	56.515	74.240	-17.7247
C. variation (%):	$C_v =$	34.217	63.362	-29.1455
Minimum	Min =	60	0	60
First quartile:	$Q_1 =$	120	60	60
Median:	$Q_2 =$	175	120	55
Third quartile:	$Q_3 =$	180	150	30
Maximum	Max =	360	300	60
10% trim mean:	$\bar{x}_{10\%} =$	160.417	111.458	48.95833



Answer: Comparing the **sample means**, girls study 48 more minutes per week than boys; excluding the outliers, the trimmed mean difference is about the same, 49 minutes. But comparing the medians, girls study 55 more minutes per week than boys. From the graph it can be seen that 75% of the girls are above the boys' median study time: 120 minutes, and about 25% of boys are below the girls' minimum study time: 60 minutes. About the variability of the study times, both the **standard deviation** and the **coefficient of variation** indicate that the girls' study times are more consistent with the mean, having (according to Chebyshev's theorem) about 75% of the girls study between 52 and 278 minutes (4 hours 40 min) per week, meanwhile about 75% of the boys study between 0 and 265 minutes (4 hours 24 min) per week. In conclusion, girls study *AP Statistics* more times per-week than boys.