Case C→Q: Applications

Learning Objective: Compare and contrast distributions (of quantitative data) from two or more groups, and produce a brief summary, interpreting your findings in context.

Here is another example:

Example: SSHA

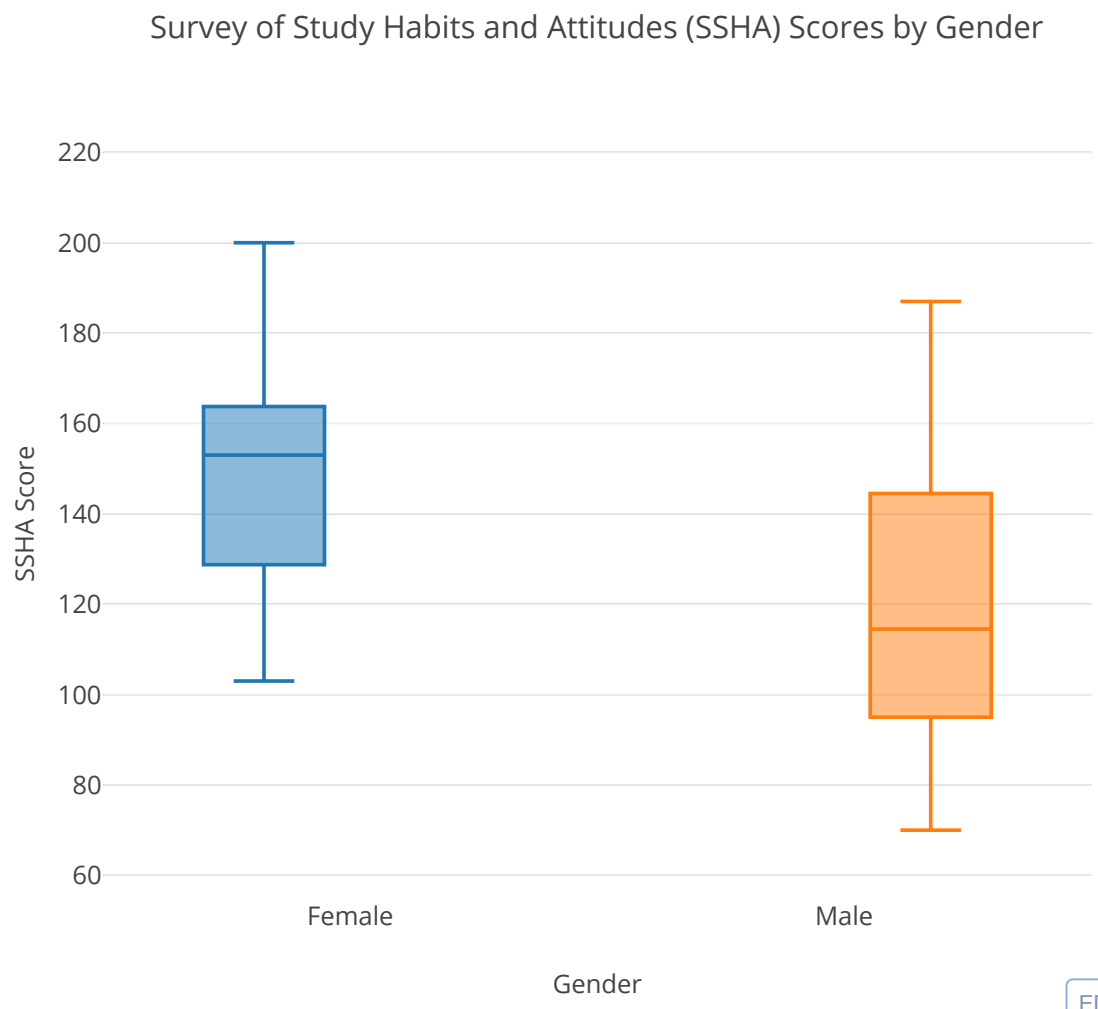
The Survey of Study Habits and Attitudes (SSHA) is a psychological test designed to measure the motivation, study habits, and attitudes toward learning of college students. Is there a relationship between **gender** and **SSHA scores**? In other words, is there a "gender effect" on SSHA scores? Data were collected from 40 randomly selected college students, and here is what the raw data look like:

Explanatory Response

	Gender	SSHA score
Student 1	Female	154
Student 2	Female	109
Student 3	Male	108
Student 4	Female	115
.	.	.
.	.	.
.	.	.
Student 40	Male	140

(Source: Moore, David S., and George P. McCabe. (2003). *Introduction to the Practice of Statistics*, 4th ed. New York: W. H. Freeman.)

Side-by-side boxplots supplemented by descriptive statistics allow us to compare the distribution of SSHA scores within each category of the explanatory variable—gender:



Statistic	Female	Male
min	103	70
Q1	128.75	95
Median	153	114.5
Q3	163.75	144.5
Max	200	187

Learn By Doing

In the following activities, let's explore the Survey of Study Habits and Attitudes (SSHA) to determine if there is there a "gender effect" on SSHA scores.

Learn By Doing

1/1 point (graded)

Do females or males have a higher median SSHA score?

- (•) Females ✔
- ( ) Males

Answer

Correct: The median SSHA score of females is higher than the median score for males (153 vs. 114.5).

Submit

Learn By Doing

1/1 point (graded)

Do females or males have higher variability in SSHA scores?

- ( ) Females
- (•) Males ✔

Answer

Correct:
Males' scores display more variability, both in terms of IQR (49.5 vs. 35) and in terms of the full range of scores (117 vs. 97).

Submit

SELF-ASSESSMENT

Status

You have completed this assignment. Review your grade and your assessment details.

Your Response ✔ COMPLETE

Assess Your Response LOADING

Your Grade: LOADING

Let's Summarize

- The relationship between a categorical explanatory variable and a quantitative response variable is summarized using:
  - **Data display:** side-by-side boxplots
  - **Numerical summaries:** descriptive statistics
- Exploring the relationship between a categorical explanatory variable and a quantitative response variable amounts to comparing the distributions of the quantitative response for each category of the explanatory variable. In particular, we look at how the distribution of the response variable differs between the values of the explanatory variable.