

## Practice Quiz: Multivariate Data

Practice Quiz • 10 min



**Congratulations! You passed!**

TO PASS 80% or higher

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GRADE

100%

## Practice Quiz: Multivariate Data

TOTAL POINTS 10

1. A bicycle rental company has counted the number of bicycle rentals in each season (spring, summer, fall, winter) for the past two years.

1 / 1 point

Additionally, the company has collected weather data (temperature, wind speed and humidity).

Use the data for bicycle rentals and weather presented in the tables and graphs below to answer these practice quiz questions.

Which proportion describes the most popular season for renting bicycles in Year 1?

	Year 1	Year 2	Total
Spring	150,000	321,348	471,348
Summer	347,316	571,273	918,589
Fall	419,650	641,479	1,061,129
Winter	326,137	515,476	841,613
Total	1,243,103	2,049,576	3,292,679

- ☐ 150,000 / 1,243,103
- ☐ 641,479 / 2,049,576
- ☒ 419,650 / 1,243,103
- ☐ 1,061,129 / 3,292,679



Correct

Correct!

2. Which proportion describes the least popular season for renting bicycles in Year 2?

	Year 1	Year 2	Total
Spring	150,000	321,348	471,348
Summer	347,316	571,273	918,589
Fall	419,650	641,479	1,061,129
Winter	326,137	515,476	841,613
Total	1,243,103	2,049,576	3,292,679

- ☐ 641,479 / 2,049,576
- ☐ 2,049,576 / 3,292,679
- ☐ 471,348 / 3,292,679
- ☒ 321,348 / 2,049,576
- ☐ 321,348 / 471,348



Correct

Correct!

3. Which statement best describes the meaning of  $326,137 / 841,613$ ?

	Year 1	Year 2	Total
Spring	150,000	321,348	471,348
Summer	347,316	571,273	918,589
Fall	419,650	641,479	1,061,129
Winter	<b>326,137</b>	515,476	<b>841,613</b>
Total	1,243,103	2,049,576	3,292,679

- ☐ The proportion of Year 1 rentals that occurred in Winter.
- ☐ The proportion of Total rentals that occurred in Winter.
- ☒ The proportion of Total Winter rentals that occurred in Year 1.
- ☐ The proportion of Total rentals that occurred in Year 1.



Correct

Good job!

4. How do the proportion of rides in the Summer compare between Year 1 and Year 2?

	Year 1	Year 2	Total
Spring	150,000	321,348	471,348
Summer	347,316	571,273	918,589
Fall	419,650	641,479	1,061,129
Winter	326,137	515,476	841,613
Total	1,243,103	2,049,576	3,292,679

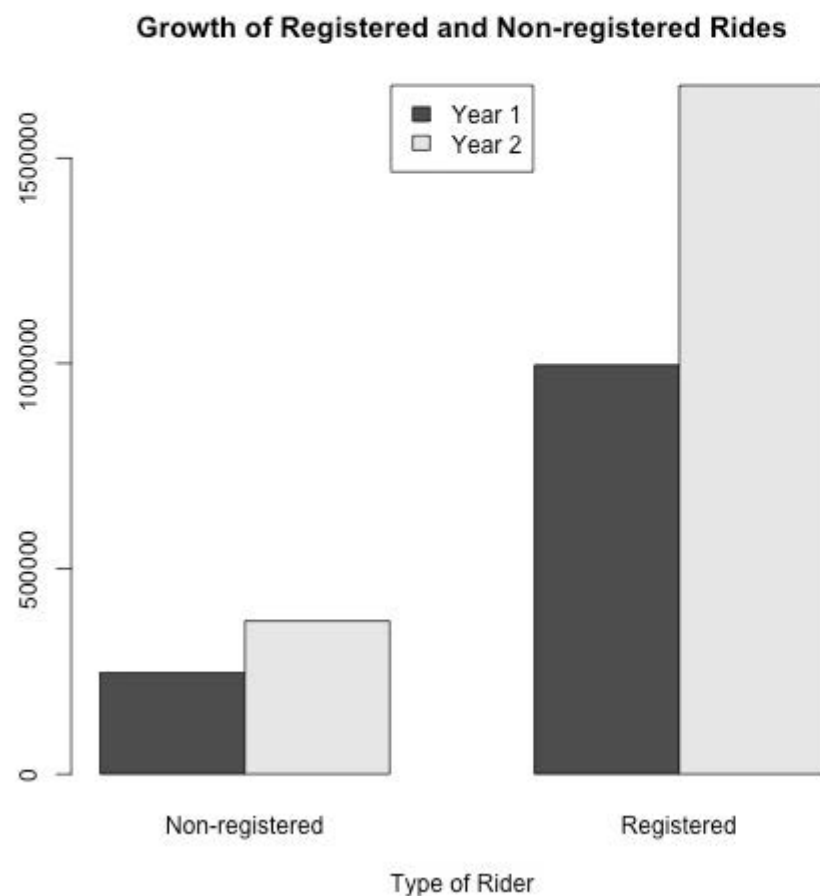
- ☐ The proportion is higher in Year 2 because 571,273 is larger than 347,316.
- ☐ The proportion is higher in Year 1 because 2,049,576 is larger than 1,243,103.
- ☒ Can't tell without doing additional calculations



Correct

Good job! We would need to compare two proportions. For this, we would need to calculate two separate proportions with two different numerators and denominators.

5. The company suspects that they will have a larger increase in rentals from registered riders compared to non-registered riders over the two years. They make this bar chart to see how the numbers compare. For which group does the increase in riders seem larger?



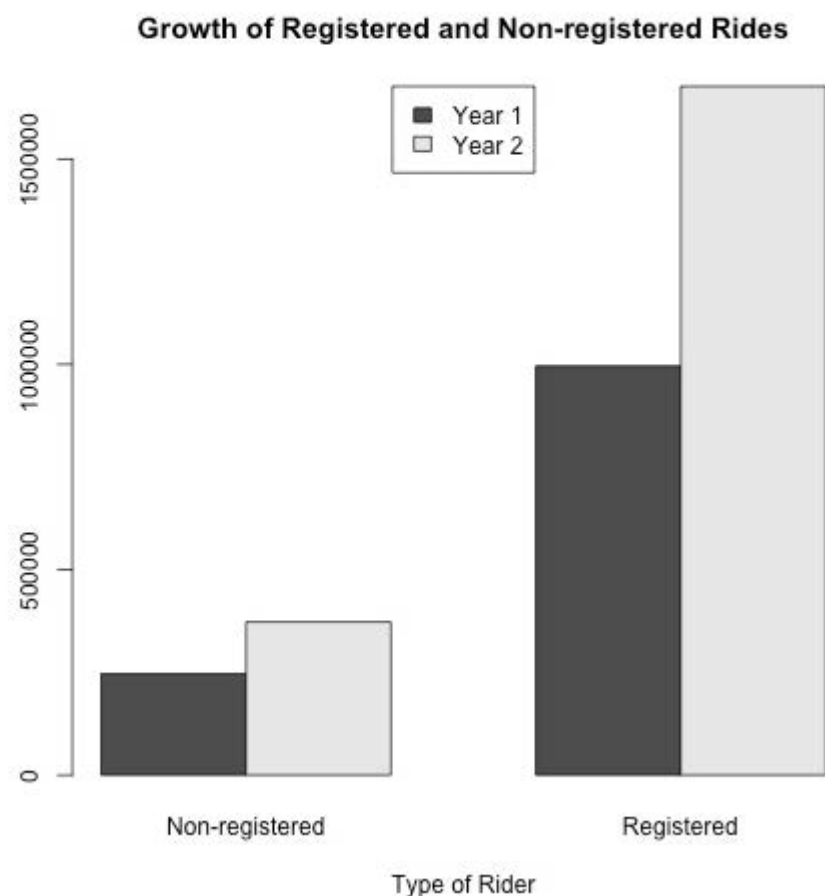
- ☐ Non-registered
- ☐ They look the same
- ☐ Can't tell from this graph
- ☒ Registered

✓ **Correct**

Good job! The increase in the height of the registered rides from Year 1 to Year 2 does seem to be the largest.

6. What kind of graph is this?

1 / 1 point





- ☐ Bar chart
- ☒ Side-by-side bar chart
- ☐ Stacked bar chart
- ☐ Mosaic plot



**Correct**

Good job! There are groupings of bars within this graph. This indicates that there are at least two groups being compared in this side-by-side bar chart.

7. The bicycle company is interested in knowing how rides are affected by various weather conditions. To start with, they want to examine the registered wind speeds (after a normalization).

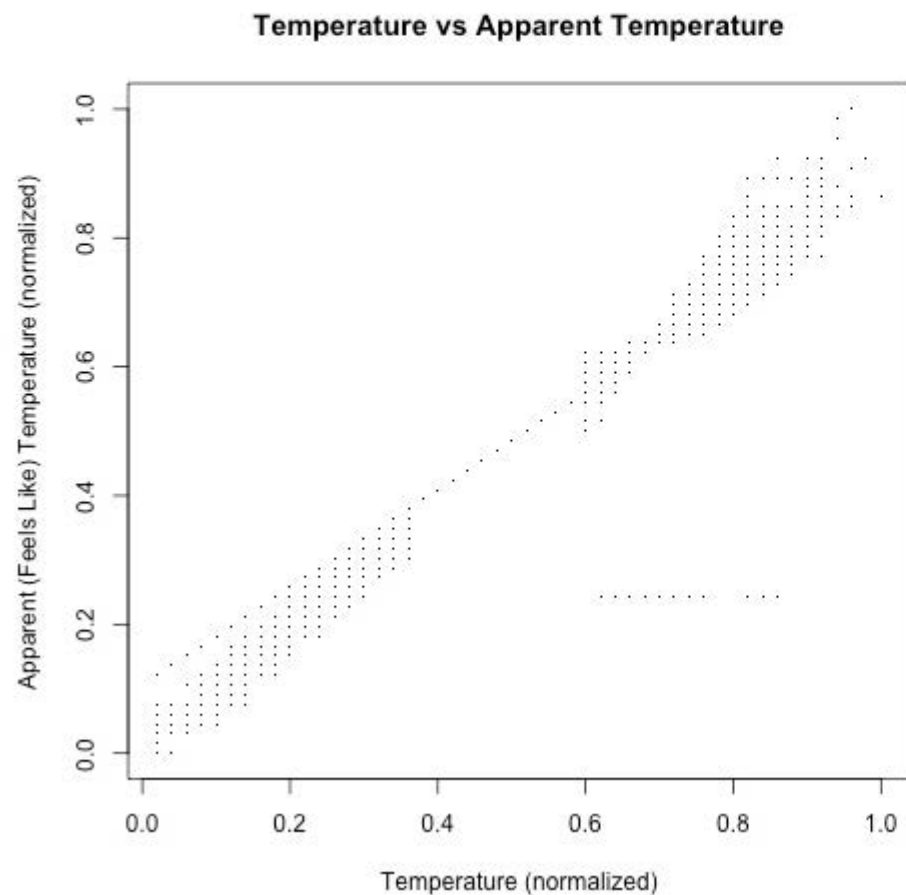
Is wind speed a discrete or continuous variable?

- ☐ Discrete
- ☒ Continuous
- ☐ Can't tell

✓ **Correct**

Good job! Wind speed is a quantitative continuous variable.

8. The company wants to consider how weather patterns affect the bicycle rentals. They first consider how the measured temperature compares to the apparent temperature, or the temperature that humans perceive it to be. The temperatures have been normalized to fall on a scale between 0 and 1. Yesterday the normalized real temperature was 0.4. Today the normalized real temperature is 0.8. Which day would you expect to have a higher apparent temperature?



☐ Yesterday

☒ Today

☐ Can't tell

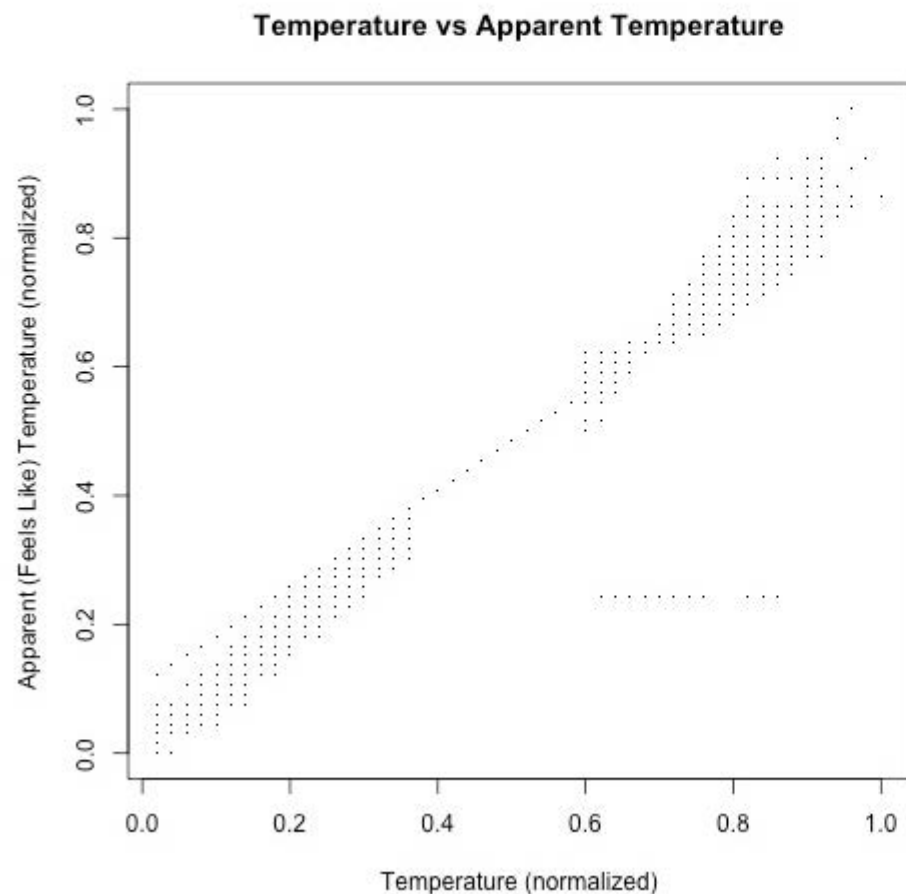


**Correct**

Good job! Because the scatterplot has a positive direction, we expect the apparent temperature to be larger when the actual temperature is larger.

9. The scatterplot between temperature and apparent temperature is linear. What is the strength of the scatterplot between temperature and apparent temperature?

1 / 1 point



- ☒ Strong
- ☐ Moderate
- ☐ Weak
- ☐ Can't tell

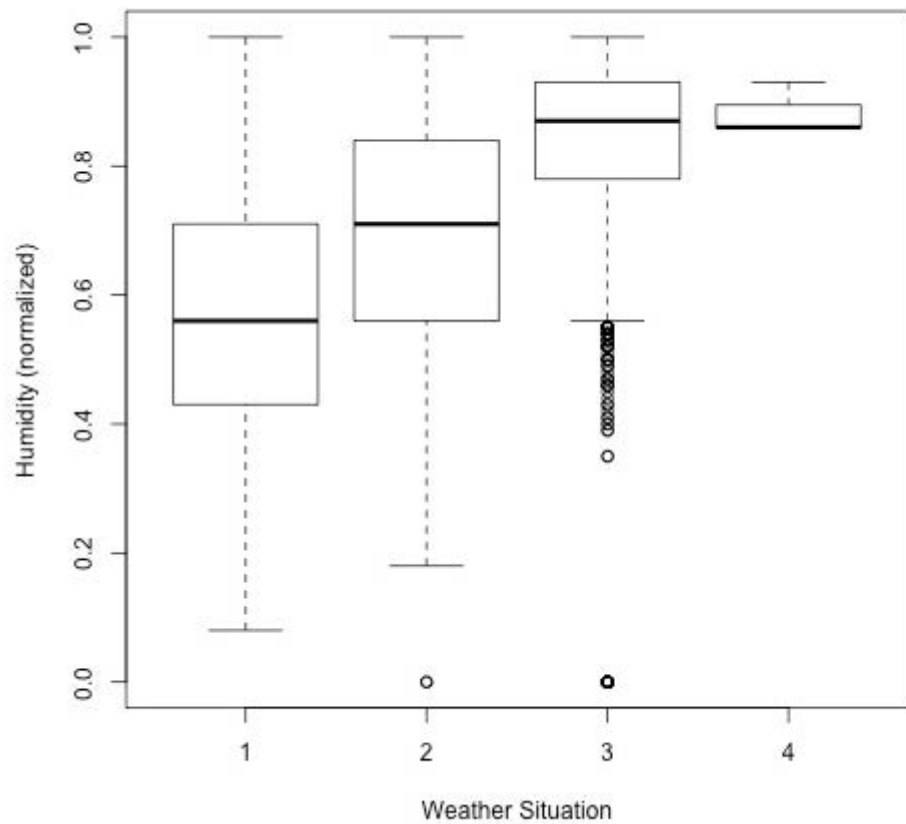
✓ **Correct**

Good job! Almost all of the point are very close to a line, so we consider the strength of the linear relationship to be strong.

10. Eventually, the bicycle company wants to think about how bicycle rides vary based on weather. After looking at humidity, they think that the humidity might be associated with the general weather conditions. They consider weather situations of 1 = clear to partly cloudy, 2 = misty with no to some clouds, 3 = light rain and light snow, and 4 = heavy rain, snow, thunderstorms, and other extreme weather. Based on the side-by-side boxplots below, which weather condition has the highest mean humidity?

1 / 1 point

Humidity by Weather



- ☐ 1 = Clear to partly cloudy
- ☐ 2 = Misty with no to some clouds
- ☐ 3 = Light rain and light snow
- ☐ 4 = Heavy rain, snow, thunderstorms, and other extreme weather
- ☒ Can't tell



**Correct**

Good job! A mean is not shown in boxplots, although the median is.