

How to Identify Bivariate Data: 5 Real-Life Examples

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Bivariate data is data that contains two variables, typically represented by two axes on a graph. Examples of bivariate data in real life include the relationship between age and height of a group of people, the relationship between temperature and rainfall in a certain area, the relationship between number of hours studied and test scores of a group of students, the relationship between hours worked and income level of a group of workers, and the relationship between type of diet and weight of a group of people.

Bivariate data refers to a dataset that contains exactly two variables.

This type of data occurs all the time in real-world situations and we typically use the following methods to analyze this type of data:

Scatterplots

Correlation Coefficients

Simple Linear Regression

The following examples show different scenarios where bivariate data appears in real life.

Example 1: Business

Businesses often collect bivariate data about total money spent on advertising and total revenue.

For example, a business may collect the following data for 12 consecutive sales quarters:

Advertising Spend	Total Revenue
\$14,500	\$59,000
\$19,000	\$64,000
\$22,400	\$89,000
\$28,900	\$86,000
\$30,000	\$94,000
\$32,000	\$104,000
\$29,000	\$89,000
\$28,000	\$82,000
\$32,000	\$88,000
\$35,000	\$103,000
\$29,000	\$94,000
\$38,000	\$140,000

This is an example of bivariate data because it contains information on exactly two variables: advertising spend and total revenue.

The business may decide to fit a to this dataset and find the following fitted model:

$$\text{Total Revenue} = 14,942.75 + 2.70 * (\text{Advertising Spend})$$

This tells the business that for each additional dollar spent on advertising, total revenue increases by an average of \$2.70.

Example 2: Medical

Medical researchers often collect bivariate data to gain a better understanding of the relationship between variables related to health.

For example, a researcher may collect the following data about age and resting heart rate for 15 individuals:

Age	Resting Heart Rate
18	51
20	57
24	59
28	55
29	67
30	68
36	64
39	71
45	67
49	72
53	70
56	75
68	71
71	69
75	79

The researcher may then decide to calculate the correlation between the two variables and find it to be **0.812**.

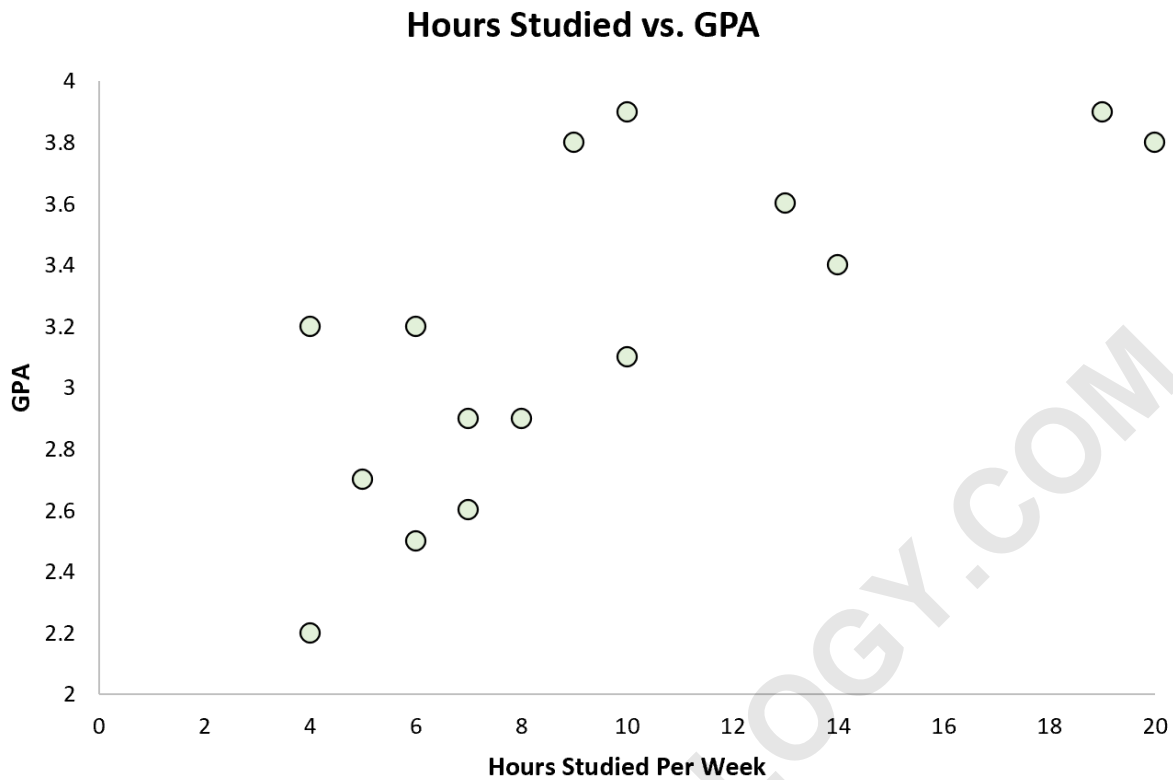
Example 3: Academics

Researchers often collect bivariate data to understand what variables affect the performance of university students.

For example, a researcher may collect data on the number of hours studied per week and the corresponding GPA for students in a certain class:

Hours	GPA
6	3.2
9	3.8
10	3.9
13	3.6
6	2.5
5	2.7
7	2.9
19	3.9
20	3.8
14	3.4
10	3.1
7	2.6
4	2.2
8	2.9
4	3.2

She may then create a simple scatterplot to visualize the relationship between these two variables:



Clearly there is a positive association between the two variables: As the number of hours studied per week increases, the GPA of the student tends to increase as well.

Example 4: Economics

Economists often collect bivariate data to understand the relationship between two socioeconomic variables.

For example, an economist may collect data on the total years of schooling and total annual income among individuals in a certain city:

Years of Schooling	Annual Income
12	\$36,000
11	\$32,000
16	\$58,000
16	\$65,000
16	\$76,000
18	\$89,000
17	\$45,000
20	\$84,000
17	\$125,000
...	...

He may then decide to fit the following simple linear regression model:

$$\text{Annual Income} = -45,353 + 7,120 * (\text{Years of Schooling})$$

This tells the economist that for each additional year of schooling, annual income increases by \$7,120 on average.

Example 5: Biology

Biologists often collect bivariate data to understand how two variables are related among plants or animals.

For example, a biologist may collect data on total rainfall and total number of plants in different regions:

Total Rainfall (inches)	Total Number of Plants
14	450
12	413
20	490
22	566
24	576
29	640
13	340
6	130
11	190
...	...

The biologist may then decide to calculate the correlation between the two variables and find it to be **0.926**.

This indicates that there is a strong positive correlation between the two variables.

That is, higher rainfall is closely associated with an increased number of plants in a region.

The following tutorials provide additional information about bivariate data and how to analyze it.