> **Prerequisite Skills**
>
> This lesson requires the use of the following skills:
>
> - creating tables with multiple rows and columns (no standard)
>
> - reading tables with multiple rows and columns (no standard)

Introduction

When data compares characteristics of two or more categories, the data can be displayed in a two-way frequency table. In this lesson, we focus on two-way frequency tables that compare survey results. When used to analyze survey results, a **two-way frequency table** is a table of data that separates responses by a characteristic of the respondents.

Type of characteristic	Type of response	
	Response 1	**Response 2**
Characteristic 1	a	b
Characteristic 2	c	d

Each cell in the table contains a count of the people with a given characteristic who gave each response. For example, in this table, a, b, c, and d would each represent the number of responses given by people with each characteristic. That is, a represents people with Characteristic 1 who gave Response 1, b represents people with Characteristic 1 who gave Response 2, and so on. The sum of all the cells, $a + b + c + d$, is the total number of respondents. Two-way frequency tables help organize information and provide greater insight into features of a population being surveyed. A **trend**, or pattern in the data, can be examined using a two-way frequency table.

A **joint frequency** is the number of times a pair of characteristics appear together. The entries in the cells of a two-way frequency table are joint frequencies. In the sample table, a, b, c, and d are each a joint frequency. A **marginal frequency** is the total number of times a characteristic occurs. This is the sum of either a row or a column in a two-way frequency table. In the sample table, $a + b$ would be the marginal frequency of people with Characteristic 1.

A **conditional relative frequency** allows a comparison to be made between a joint frequency and the total number of responses in a single row, a single column, or the entire table. Relative frequencies are usually expressed as a decimal. They are found by dividing the number of responses by either the total number of people who gave that response, the total number of people with a given characteristic, or the total number of respondents. In the sample table, $\dfrac{a}{a+b}$ is the relative frequency of Response 1 for people with Characteristic 1.

Key Concepts

- A two-way frequency table divides survey responses by characteristics of respondents.

- The number of times a response was given by people with a certain characteristic is called a joint frequency.

- A marginal frequency is the total number of times a response is given, or the total number of people with a certain characteristic.

- A conditional relative frequency is usually written as a decimal. It expresses a number of responses divided by the total number of respondents, the total number of people with a given characteristic, or the total number of times a specific response was given.

- Trends, or patterns of responses, can be identified by looking at the frequency of responses.

Common Errors/Misconceptions

- incorrectly locating frequencies in the table

- incorrectly calculating conditional relative frequencies by being inconsistent in the method used (dividing by the number of times a response was given, the number of people with a given characteristic, or the total number of respondents)