Unit 3 Family Support Materials

Two-Variable Statistics

In this unit, students learn about **two-way tables** and use them to determine if two categories have an association. We say that categories are associated if there appears to be a trend so that knowing about one category can help you guess something about the other category. For example, a forecast of rain over a school is probably associated with the number of students wearing rain boots. If we know it is going to rain, we might guess that more students will be wearing rain boots. Do you think a rain prediction is associated with students' eye colors?

Two things can have no association, as you may have guessed for rain and students' eye colors. With your student, make predictions about associations found in daily life. For example, do these pairs share an association?

- The length of time a plant spends in sunlight and its growth
- The size of a car and the amount of gas it takes for the tank to be full
- The number of open apps on your mobile phone and battery percentage

What other associations can you think of together?

Students can use tables and collected data to determine if two things are associated. One type of table is a **two-way table**, which organizes two categorical variables. A **categorical variable** is a variable that takes on values that can be divided into groups or categories. For example, color is a categorical variable that can take on values like red, blue, or green. In the table, you may notice that it has a total of four categories, but only two categorical variables (hand dominance and fruit preference).

Here is a task for you to try with your student:

With your student, examine the data collected from 1,914 other students.

	prefer mangoes	prefer pineapples	total
left-handed	50	66	116
right-handed	826	972	
total	876		1,914

1. Predict if there is an association between hand dominance and fruit preference.

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2. Complete the table with the totals for each column and row.
3. Among the left-handed students, the proportion who prefer pineapples is about 0.57, because $66 \div 116 = 0.57$. This means that about 57% of students in this group who are left-handed prefer pineapples over mangoes. What proportion of those who are left-handed prefer mangoes?
4. What proportion of those who are right-handed prefer mangoes?
5. Is there a significant difference between the proportion of left-handed students who prefer mangoes and the proportion of right-handed students who prefer mangoes?
6. If the proportions are very different, we might suspect that there is an association between the variables. Is there an association between hand dominance and fruit preference? Was your prediction accurate?

Solution

1. Sample response: I think there shouldn't be any association between hand dominance and fruit preference, since neither should influence the other.
2.

	prefer mangoes	prefer pineapples	total
left-handed	50	66	116
right-handed	826	972	1,798
total	876	1,038	1,914

3. 0.43, because $50 \div 116 = 0.43$, or $1 - 0.57 = 0.43$
4. 0.46, because $826 \div 1,798 = 0.46$
5. No, there is no significant difference between left-handed students who prefer mangoes and right-handed students who prefer mangoes, because 0.43 and 0.46 are close in value.
6. Sample response: No, there is no association between hand dominance and fruit preference. I predicted there would be no association, and I think that the math supports my prediction.