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Statistics Package Exercise: Building A Two-Way Table

Learning Objective: Produce a two-way table, and interpret the information stored in it about the association between two categorical variables by comparing conditional percentages.

Background

An Associated Press article captured the attention of readers with the headline "Night lights bad for kids?" The article was based on a 1999 study at the University of Pennsylvania and Children's Hospital of Philadelphia, in which parents were surveyed about the lighting conditions under which their children slept between birth and age 2 (lamp, night-light, or no light) and whether or not their children developed nearsightedness (myopia). The purpose of the study was to explore the effect of a young child's nighttime exposure to light on later nearsightedness.

In this activity, we will use the collected data to:

- learn how to build a two-way table and compute conditional percentages.
- interpret the data in terms of the relationship between a young child's nighttime exposure to light and later nearsightedness.

- R | StatCrunch | TI Calculator | Minitab | Excel

R Instructions

To open R with the dataset preloaded, right-click here and choose "Save Target As" to download the file to your computer. Then find the downloaded file and double-click it to open it in R.

The data have been loaded into the data frame

```
nightlight
```

. Enter the command

```
nightlight
```

to see the data. There are two variables:

```
Light
```

and

```
Nearsightedness
```

.

You should see a report about 479 subjects with two columns. The first column records what kind of light, if any, was used in the subjects' bedrooms while they slept, and the second column indicates whether or not the subjects later became nearsighted.

Since there are only two variables in the data frame, we can obtain a summary of the data in a two-way table by using the

```
table()
```

command on data frame name:

```
t = table(nightlight);t
```

If the data frame had more than two variables then specific variables must be identified within the

```
table()
```

command, with the first entry representing the row values and the second entry representing the column values.

```
tt = table(nightlight$Light,nightlight$Nearsightedness);tt
```

To create a table of conditional proportions showing which proportion of children in each treatment group became nearsighted, we must divide each table entry by the total number of

entries in its row. To do this, copy the following command to R:

```
prop.table(t,1)
```

To create a table of conditional proportions showing which proportion of children who are nearsighted or not were in each treatment group, we must divide each table entry by the column totals. To do this, copy the following command to R:

```
prop.table(t,2)
```

To create a table of conditional percentages, simply muliply the above commands by 100, like so:

```
prop.table(t,1)*100
```

Learn By Doing (1/1 point)

Compare the distribution of nearsightedness between those exposed to lamp light, a night-light, or no light at all. What do the conditional percentages derived from the data suggest about the relationship between early nighttime exposure to light and later myopia? Should parents worry about using night-lights and lamps with young children?

Your Answer:

Based on the table, 57.7% of nearsighted people were previously exposed to a nightlight and 29.9% of them were exposed to a lamp. Only 12% of them -- the smallest share -- were exposed to no light.

Meanwhile, along the people with no nearsightedness, the largest share of them -- 45.3% -- were also exposed to no light.

Our Answer:

Of the three groups of children, those who were exposed to no light at all were least likely to be nearsighted, with an incidence of 9.9%. Those exposed to a night-light were nearsighted 34.1% of the time, and those exposed to a lamp were nearsighted 54.7% of the time. Note that these percentages show that children who slept with a lamp were about 5 times more likely to develop nearsightedness than the children who slept with no light.Based upon this data alone, parents might discontinue using night-lights and lamps with young children, as their use seems to be associated with nearsightedness when the children grow up. However, there is a strong argument against this conclusion, which will be presented in a later lesson.

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