AP Statistics: 4-3

Two Way Tables: Marginal and Conditional Distributions

Marginal Distributions: show us overall distributions (based on the overall total)

Conditional Distributions: restricts the view to a specific characteristic (based on a specific total)

If the marginal and conditional distributions are the same (or close), then the variables are independent.

This means that putting a condition on one variable has no impact on the overall distribution.

If the restriction on a variable results in the conditional distribution looking different than the marginal distribution, then the variable has somehow influenced the results, so the variables are not independent.

EX: Favorite colors

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Red | Blue | Green | Total |
| Boys | 2 | 4 | 6 |  |
| Girls | 5 | 3 | 2 |  |
| Total |  |  |  |  |

Find the marginal totals and put them in the table

Find the marginal distributions for each category and put them in the table

Find the conditional distribution of color preference among girls (look only at girls)

Find the conditional distributions of color preference among boys (look only at boys)

Create a segmented bar graph of color preference for each gender:

Of students who prefer red, what percent are boys? Girls?

Given those who prefer blue, what percent are boys? Girls?

Find the conditional distributions of students who prefer green:

Create a segmented bar graph of gender given color:

Are gender and color preference independent (do the conditional distributions equal the marginal distributions)?