2-Way Frequency Tables

EQ: How do I describe the probability of categorical data?

What am I learning today?

How to create and analyze 2-category data tables

How will I show that I learned it?

Create a relative frequency table and discuss the popularity of different options

Vocabulary - Review

- <u>Q</u>uantitative Data – Data that can be <u>measured</u> and is reported in a <u>numerical</u> form.

- <u>Categorical/Qualitative Data</u> – Data that can be <u>observed</u> but not measured and is sorted by categories.

2-way frequency tables are used to represent categorical data that each have 2 details. We assume that there is no overlap in these tables.

Example:

🟡 =
2 category data

🔵 = 1 category data

Participation in School Activities			
School Club	**Gender**		
	Male	Female	Totals
Band	12 +	21	33 ✓
Chorus	15	17	32
Chess	16	3	19
Latin	7	9	16
Yearbook	28	7	35
Totals	✓78 +	57 =	**135**

Total number of Participants

Relative frequency table shows the popularity of each category using percents or decimals.

Example:

$$\frac{21}{135} = 0.156$$

Participation in School Activities

School Club	Gender		
	Male	Female	Totals
Band	8.9%	15.6%	24.5%
Chorus	11.1%	12.6%	23.7%
Chess	11.9%	2.2%	14.1%
Latin	5.2%	6.7%	11.9%
Yearbook	20.7%	5.2%	25.9%
Totals	57.8%	42.3%	**100%**

$$\frac{19}{135} = 14.1$$

$$\frac{135}{135} = 100\%$$

3 types of numbers in a frequency table.

Participation in School Activities

School Club	Gender		
	Male	Female	Totals
Band	12	21	33
Chorus	15	17	32
Chess	16	3	19
Latin	7	9	16
Yearbook	28	7	35
Totals	78	57	**135**

2-Category Data

1-Category Data

Total Number of Respondents

Joint Frequency =   <u>2-category number</u>
                                total number

Example: What is the joint frequency of a student who is male and in band?

$$.089 = \frac{12}{135} = \frac{2cat}{total}$$

$$\boxed{8.9\%}$$

Marginal Frequency =   <u>1-category number</u>
                                total number

Example: What is the marginal frequency of a student who is in yearbook?

$$.2592 = \frac{35}{135} = \frac{1\,cat}{total}$$

$$\boxed{25.9\%}$$

Conditional Frequency = $\dfrac{\text{2-category number}}{\text{1-category number}}$

Example: What is the conditional frequency that a male is in Latin?

$$\frac{2\,cat}{1\,cat} = \frac{7}{78} = .0897 \approx 9.0\%$$

Grade	Hours spent on homework		
	0–2	2–4	More than 4
9	38	12	2
10	21	25	9
11	14	18	20

$$\frac{52}{55}$$
$$\frac{52}{159}$$

73   55   31

What percentage of students were 9th graders who worked more than 4 hours on homework?   Type of frequency?

were is of $.0125 \quad \dfrac{2}{159}$ joint

1.3%   159 —total $\dfrac{2\,cat}{\text{}}$

What percentage of students were 11th graders?
Type of frequency?

$\dfrac{1cat}{total}$ $\dfrac{52}{159} = .3270 \quad 32.7\%$ marginal

What percentage of students who worked 0-2 hours on homework were 10th graders?   Type of frequency?

$\dfrac{21}{73}$ −2cat $= .2876$ conditional

of   −1-cat 28.8%

Gender	Preferred sport		
	Baseball	Soccer	Basketball
Male	49	52	16
Female	23	64	33

72   **116**   **49**   **117**
                                                120
                                                237

What percentage of the people surveyed were female?

Type of frequency?

$$\frac{120}{237} = 50.6\% \quad \text{marginal}$$

0.5063

What percentage of males preferred soccer?

Type of frequency?

$$\frac{52}{117} = 44.4\% \quad \text{conditional}$$

What percentage of the people surveyed were females who preferred basketball?

Type of frequency?

$$\frac{83}{237} = 13.92 \quad 13.9\%$$

joint