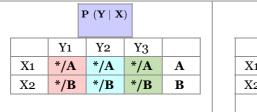
${\bf Conditional \, Probability} = \frac{{\bf Joint \, Probability}}{{\bf Marginal \, Probability}}$

Bayes' Rule

$$\mathbf{P} \; \left(\mathbf{X} \mid \mathbf{Y} \right) = \; \frac{\mathbf{P} \; \left(\mathbf{Y} \mid \mathbf{X} \right) \; \times \; \mathbf{P} \left(\mathbf{X} \right)}{\mathbf{P} \left(\mathbf{Y} \right)}$$

• Two variables are independent if conditional distributions on one of them is identical to each category of the other.



	P (X	Y)	
	Y1	Y2	Y3
X1	*/K	*/L	*/ M
X2	*/K	*/L	*/ M
	K	L	M

- That is, you find any one of the conditional distributions, and the values in same shaded cells should be equal.
- · Then we say both variables are independent of each other.

In contingency table,

Expected frequency:

$$f_e = rac{ ext{Row total} imes ext{Column total}}{ ext{Total Sample size}}$$

Degree of Freedom,

$$oldsymbol{df} = (oldsymbol{r} - oldsymbol{1}) imes (oldsymbol{c} - oldsymbol{1})$$

Chi Square formula,

$$\chi^2~=~\Sigmarac{\left(f_o~-~f_e
ight)^2}{f_e}$$

We **accept** the null hypothesis if:

Tabular value ≥ Calculated value

or if:

p-value > a