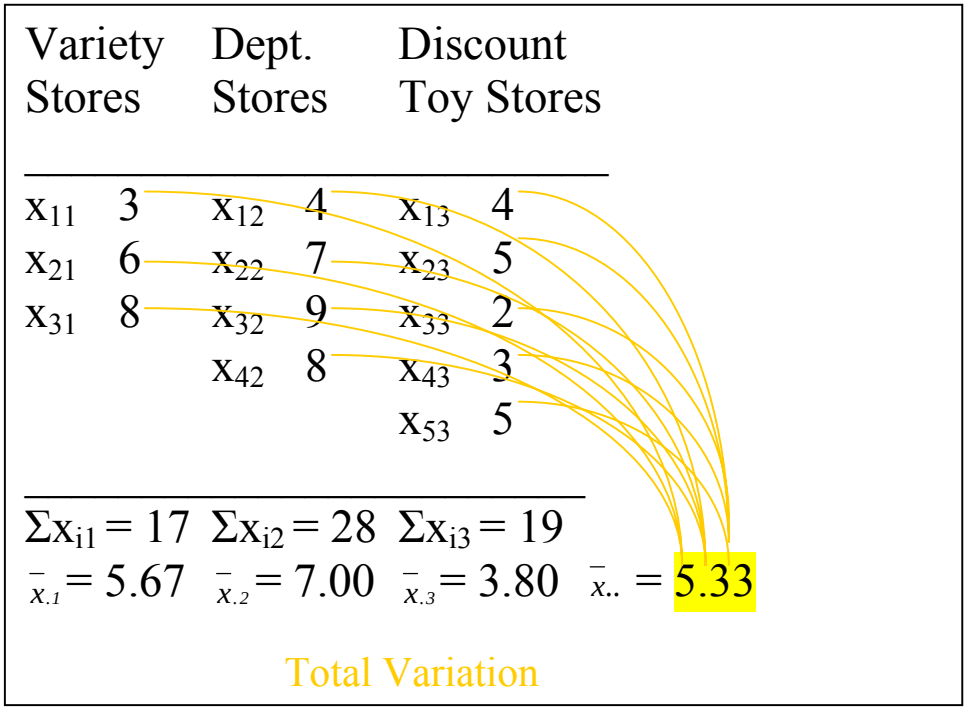
Analysis of Variance: Visually Explained



$$Variance = \frac{\sum Deviation^2}{N-1} \qquad s^2 = \frac{\sum (X - \bar{X})^2}{N-1}$$

$$s^2 = \frac{\sum_{j=1}^{k}\sum_{i=1}^{n}(x_{ij} - \bar{x}_{..})^2}{N-1}$$

Variety Stores		Dept. Stores		Discount Toy Stores	
x_{11}	3	x_{12}	4	x_{13}	4
x_{21}	6	x_{22}	7	x_{23}	5
x_{31}	8	x_{32}	9	x_{33}	2
		x_{42}	8	x_{43}	3
				x_{53}	5
$\Sigma x_{i1} = 17$		$\Sigma x_{i2} = 28$		$\Sigma x_{i3} = 19$	
$\bar{x}_{.1} = 5.67$		$\bar{x}_{.2} = 7.00$		$\bar{x}_{.3} = 3.80$	$\bar{x}_{..} = 5.33$

Between Variation

Variety Stores		Dept. Stores		Discount Toy Stores	
x_{11}	3	x_{12}	4	x_{13}	4
x_{21}	6	x_{22}	7	x_{23}	5
x_{31}	8	x_{32}	9	x_{33}	2
		x_{42}	8	x_{43}	3
				x_{53}	5
$\Sigma x_{i1} = 17$		$\Sigma x_{i2} = 28$		$\Sigma x_{i3} = 19$	
$\bar{x}_{.1} = 5.67$		$\bar{x}_{.2} = 7.00$		$\bar{x}_{.3} = 3.80$	$\bar{x}_{..} = 5.33$

Within Variation

$$F = \frac{\text{Between Variation}}{\text{Within Variation}}$$