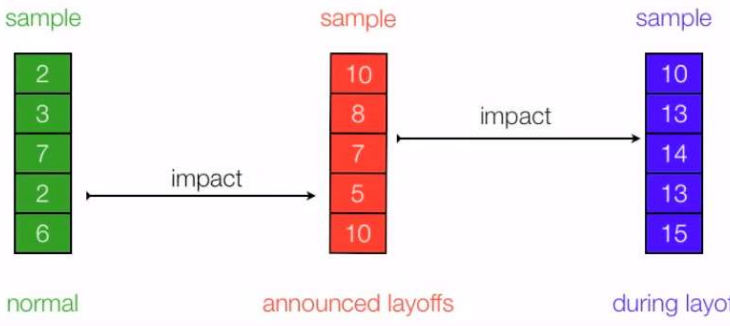
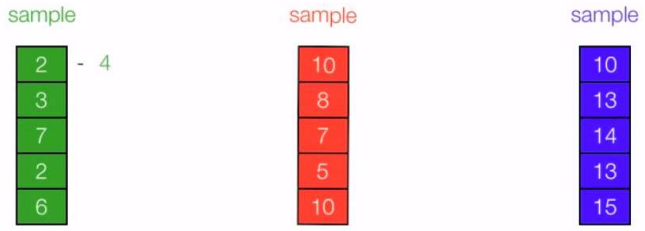
Analysis of Variance

levels of stress



Sum of Squares Within Groups



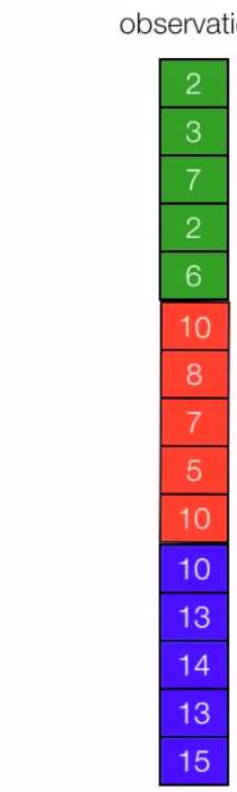
mean	4	8	13

Sum of Squares Within Groups

sample			sample			sample		
2	$-4 = -2^2$	4	10	$-8 = 2^2$	4	10	$-13 = -3^2$	9
3	$-4 = -1^2$	1	8	$-8 = 0^2$	0	13	$-13 = 0^2$	0
7	$-4 = 3^2$	9	7	$-8 = -1^2$	1	14	$-13 = 1^2$	1
2	$-4 = -2^2$	4	5	$-8 = -3^2$	9	13	$-13 = 0^2$	0
6	$-4 = 2^2$	4	10	$-8 = 2^2$	4	15	$-13 = 2^2$	4
		22			18			14

Sum of Squares Within Groups = 22 + 18 + 14 = 54

SSW



mean 8.3

observation		mean	observation - mean	(observation - mean) ^{2}
2	-	8.3	**= -6.3**	40.1
3	-	8.3	= -5.3	28.4
7	-	8.3	= -1.3	1.8
2	-	8.3	= -6.3	40.1
6	-	8.3	= -2.3	5.4
10	-	8.3	= 1.7	2.7
8	-	8.3	= -0.3	0.1
7	-	8.3	= -1.3	1.8
5	-	8.3	= -3.3	11.1
10	-	8.3	= 1.7	2.8
10	-	8.3	= 1.7	2.8
13	-	8.3	= 4.7	21.8
14	-	8.3	= 5.7	32.1
13	-	8.3	= 4.7	21.8
15	-	8.3	= 6.7	44.4

Total **S**um of **S**quares

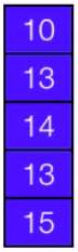
SST = 257.3

Sum of Squares Between Groups

mean

mean

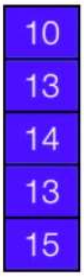
mean



mean

1. mean - mean mean - mean mean - mean
2. $(\text{mean} - \text{mean})^2$ $(\text{mean} - \text{mean})^2$ $(\text{mean} - \text{mean})^2$
3. $(\text{mean} - \text{mean})^2 + (\text{mean} - \text{mean})^2 + (\text{mean} - \text{mean})^2$
4. $(\text{mean} - \text{mean})^2 + (\text{mean} - \text{mean})^2 + (\text{mean} - \text{mean})^2 \times 5$

Sum of Squares Between Groups



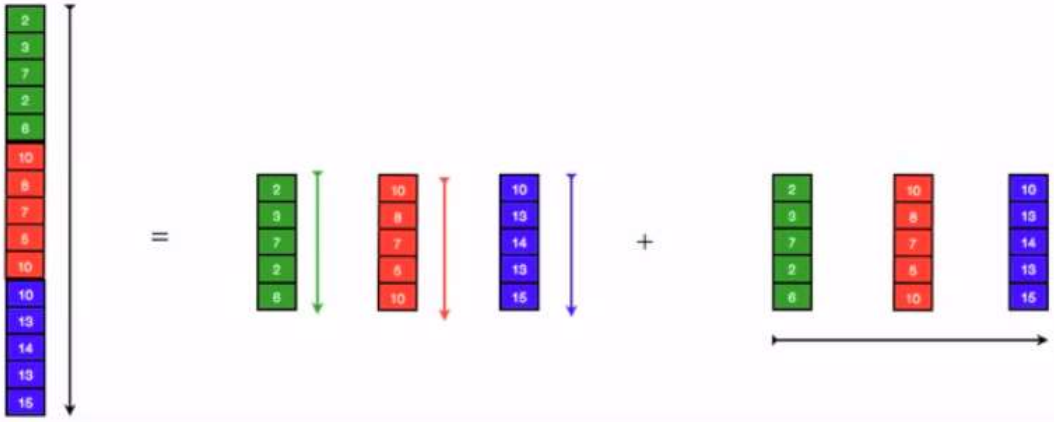
mean $4 - 8.3 = (-4.3)^2$ $8 - 8.3 = (-.3)^2$ $13 - 8.3 = (4.7)^2$

$18.8 + .1 + 21.8 = 40.7$

$40.7 \times 5 = 203.3$

Analysis of Variance

F Ratio



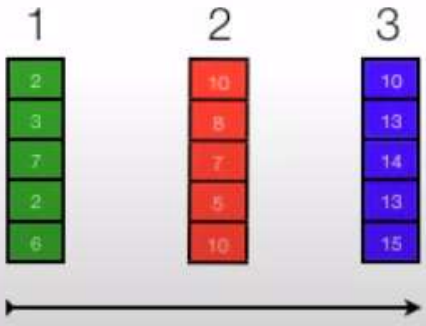
Total Sum of Squares = Sum of Squares Within Groups + Sum of Squares Between Groups

257.3 = 54 + 203.3

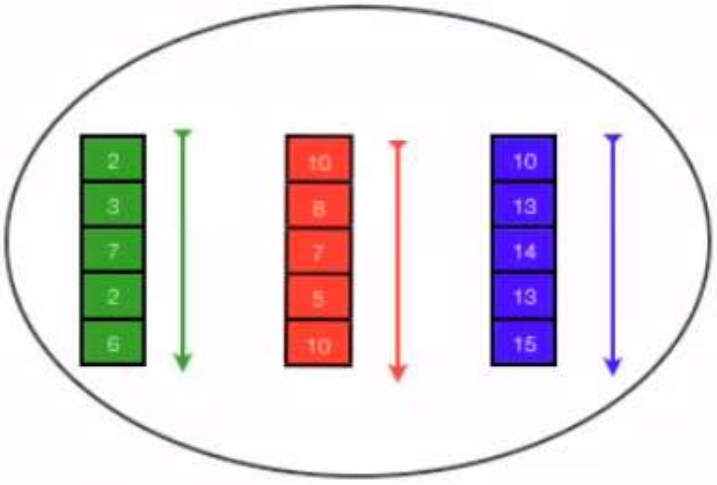
$$\frac{\text{Sum of Squares Between Groups}}{\text{degrees of freedom}} = \frac{203.3}{2}$$

Groups - 1

3 - 1 =



$$\frac{\text{Sum of Squares Between Groups}}{\text{degrees of freedom}} = \frac{203.3}{2} = 101.667$$



15 - 3 = 12

Observations - Groups

$$\frac{\text{Sum of Squares Within Groups}}{\text{degrees of freedom}} = \frac{54}{}$$

$$\frac{\text{Sum of Squares Within Groups}}{\text{degrees of freedom}} = \frac{54}{12} = 4.5$$

Final Calculations

$$\frac{\text{Sum of Squares Between Groups}}{\text{degrees of freedom}} = \frac{203.3}{2} = 101.667$$

$$F = \frac{101.667}{4.5} = 22.59$$

$$\frac{\text{Sum of Squares Within Groups}}{\text{degrees of freedom}} = \frac{54}{12} = 4.5$$

Final Calculations

$F(2,12) = 22.59,\ p<.05$

$$\frac{\text{Sum of Squares Between Groups}}{\text{degrees of freedom numerator}} = \frac{203.3}{2} = 101.667$$

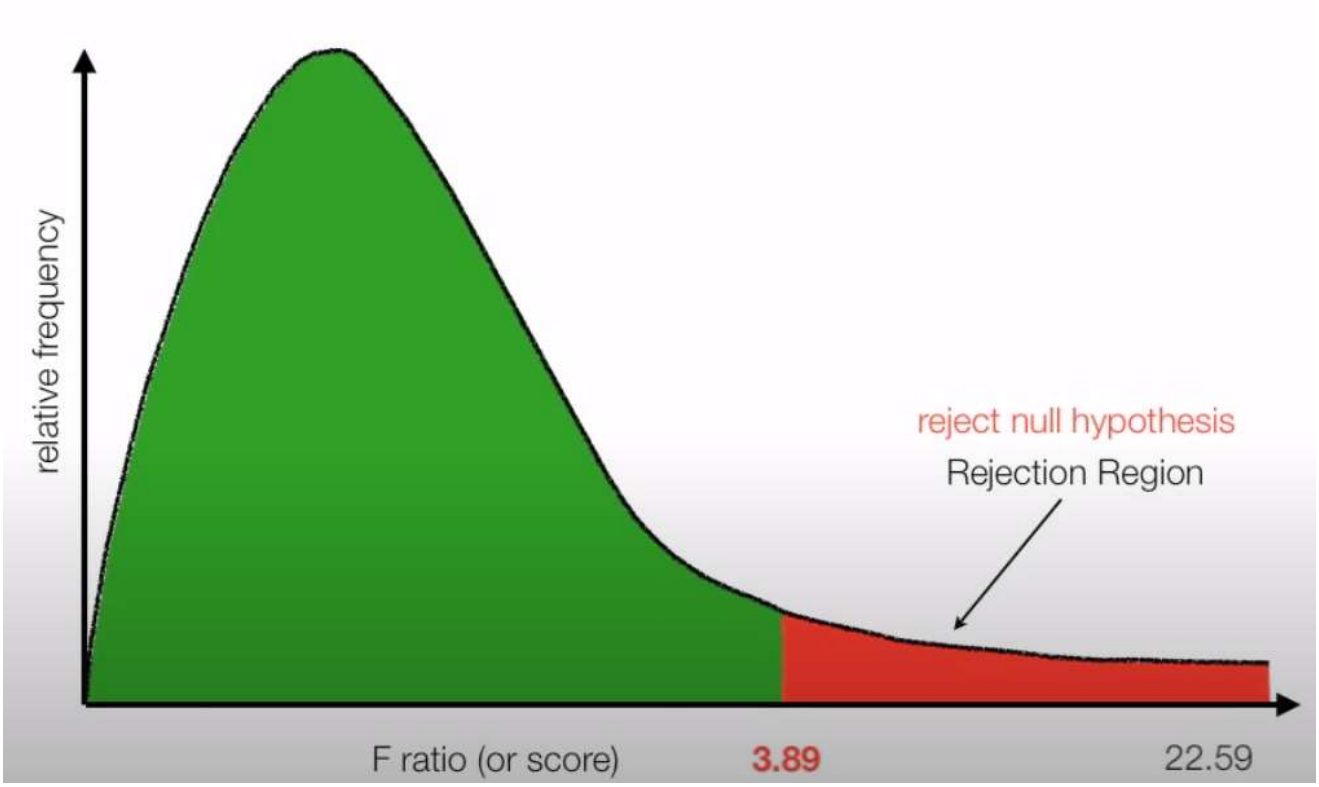
$$F = \frac{101.667}{4.5} = 22.59$$

$$\frac{\text{Sum of Squares Within Groups}}{\text{degrees of freedom denominator}} = \frac{54}{12} = 4.5$$

F Distribution $F(2,12) = 22.59,\ p<.05$

degrees of freedom numerator

degrees of freedom denominator	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	161.5	199.5	215.7	224.6	230.2	234.0	236.8	238.9	240.5	241.9	243.9	246.0	248.0	249.1	250.1
2	18.51	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.38	19.40	19.41	19.43	19.45	19.45	19.46
3	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81	8.79	8.74	8.70	8.66	8.64	8.62
4	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00	5.96	5.91	5.86	5.80	5.77	5.75
5	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77	4.74	4.68	4.62	4.56	4.53	4.50
6	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10	4.06	4.00	3.94	3.87	3.84	3.81
7	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68	3.64	3.57	3.51	3.44	3.41	3.38
8	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39	3.35	3.28	3.22	3.15	3.12	3.08
9	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18	3.14	3.07	3.01	2.94	2.90	2.86
10	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02	2.98	2.91	2.85	2.77	2.74	2.70
11	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90	2.85	2.79	2.72	2.65	2.61	2.57
12	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80	2.75	2.69	2.62	2.54	2.51	2.47
13	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.71	2.67	2.60	2.53	2.46	2.42	2.38
14	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65	2.60	2.53	2.46	2.39	2.35	2.31
15	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59	2.54	2.48	2.40	2.33	2.29	2.25


relative frequency
reject null hypothesis
Rejection Region
F ratio (or score)
3.89
22.59