

개인과제: 크래커 실험 F-test

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ANOVA TEST EX1.

Factor B: Fullness					
Factor A: Weight		Empty	Full		
	Normal	n=20 $\bar{X} = 22$ T=440 SS=1540	n=20 $\bar{X} = 15$ T=300 SS=1270	$T_{Normal} = 740$	
	Obese	n=20 $\bar{X} = 17$ T=340 SS=1320	n=20 $\bar{X} = 18$ T=360 SS=1266	$T_{obese} = 700$	
		$T_{empty} = 780$	$T_{full} = 660$		G=1440 N=80 $\Sigma X^2 = 31836$

STEP1. BUILD HYPOTHESES

STEP 1. Build hypotheses.

- 무게에 따라 각자 앞에 놓인 것을 먹는 양도 달라질 것이다.
- 포만감에 따라 각자 앞에 놓인 것을 먹는 양도 달라질 것이다.
- 무게와 포만감은 상호의존적인 상태이므로 포만감에 의한 차이에는 무게에 따라 달라질 것이다.

STEP 2. Locate the critical range for F-ratio. Calculate the dfs.

1. $df_{total} : N-1 = 80-1 = 79$
2. $df_{within} : df_{total} - df_{between} = 79-3 = 76$
3. $df_{between} : k-1 = 4-1 = 3$
4. $df_A : (\text{number of levels of As}) - 1 = 2-1 = 1$
5. $df_B : (\text{number of levels of Bs}) - 1 = 1$
6. $df_{A \times B} : df_{between} - df_A - df_B = 3-1-1 = 1$

Compute F-ratio

SS

1. $SS_{total} : 5916$

$$\Sigma X^2 - N * (\bar{X}_t)^2 = 31836 - 25920 = 5916$$

1. $SS_{within} : 5396$

$$SS_{within} = SS_{within} = 1540 + 1270 + 1320 + 1266 = 5396$$

1. SSbetween : $SS_{total} - SS_{within} = 5916 - 5396 = 520$

1. SSA : = $\sum \frac{T_A^2}{n_A} - \frac{G^2}{N}$ $(740)^2/40 + (700)^2/40 - (1440)^2/80 = 20$

2. SSB : = $\sum \frac{T_B^2}{n_B} - \frac{G^2}{N}$ $(780)^2/40 + (660)^2/40 - (1440)^2/80 = 180$

3. SSAxB : $SS_{between} - SSA - SSB = 520 - 20 - 180 = 320$

MS 1. MSA : $SSA/df_A = 20/1 = 20$

2. MSB : $SSB/df_B = 180/1 = 180$

3. MSAxB : $SS_{AxB}/df_{AxB} = 320/1 = 320$

4. MSwithin : $SS_{within}/df_{within} = 5396/76 = 71$

F-ratio

1. FA = $MSA/MS_{within} = 20/71 = 0.2816$

2. FB = $MSB/MS_{within} = 180/71 = 2.5352$

3. FAxB = $MS_{AxB}/MS_{within} = 320/76 = 4.5070$

Make decision

Table 1. Mean number of crackers eaten in each treatment condition			
		Fullness	
		Empty stomach	Full stomach
Weight	Normal	M=22 SD=9.00	M=15 SD=8.18
	Obese	M=17 SD=8.34	M=18 SD=8.16

Table 2. Result				
Source	SS	df	MS	F
Between treatment	520	3		
- Factor A (weight)	20	1	20	0.2816
- Factor B (fullness)	180	1	180	2.5352
- A x B interaction	320	1	320	4.5070
Within treatment	5396	76	71	
Total	5916	79		

weight x fullness factorial design