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







step 1. Build hypotheses

1. Weight에 따라 crackers 먹는 양에 차이가 있을 것이다()
2. Fullness에 따라 crackers 먹는 양에 차이가 있을 것이다()
3. Fullness와 Weight의 상호작용에 따라 crackers 먹는 양에 차이가 있을 것이다

step 2. Locate he critical range for F-ratio. calculate the 

1.  = 20 + 20 + 20 + 20 – 1 = 79
2.  = (20-1) + (20-1) + (20-1) + (20-1) = 76
3.  = 4 – 1 = 3
4.  = number of levels of A – 1 = 2 – 1 = 1
5.  = number of levels of B – 1 = 2 – 1 = 1
6.  = df(between) – df(A) – df(B) = 3 – 1 – 1 = 1

Compute F-ratio
SS

1. 







1. 



1.  = SS(total) – SS(within) = 5916 – 5396 = 520
2.  = [{(440+330)^2}+{(340+360)^2}]/40

 = (1440^2)/80

 = 20

1.  = [{(440+340)^2}/40] + [{(300+360)^2}/40] – 25920

 = 15210 + 10890 – 25920

 = 180

 = 520 – 20 – 180

= 320

MS

1.  = SS(A) / df(A) = 20/1 = 20
2.  = SS(B) / df(B) = 180/1 = 180
3.  = SS(A\*B) / df(A\*B) = 320/1 = 320
4.  = SS(within) / df(within) = 5396/76 = 71

F-ratio

1. (1,76) = MS(A) / MS(within) = 20/71 = 0.2817
2. (1,76) = MS(B) / MS(within) = 180/71 = 2.5352
3. (1,76) = MS(A\*B) / MS(within) = 320 / 71 = 4.5070

Make decision

1. Weight에 따라 crackers 먹는 양에 차이가 없다
2. Fullness에 따라 crackers 먹는 양에 차이가 없다
3. Fullness와 Weight의 상호작용에 따라 crackers 먹는 양에 차이가 있다

| **Result**  |
| --- |
| Source  | SS  | df  | MS  | F  |
| Between treatment  | 520 | 3 |  |  |
| - Factor A (weight)  | 20 | 1 | 20 | 0.2817 |
| - 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 |  |  |
| weigth x fullness factorial design  |