

Two Factor Analysis of Variance Example

Y = GPA

Factor A: Seat location in classroom (Front, Middle, Back)

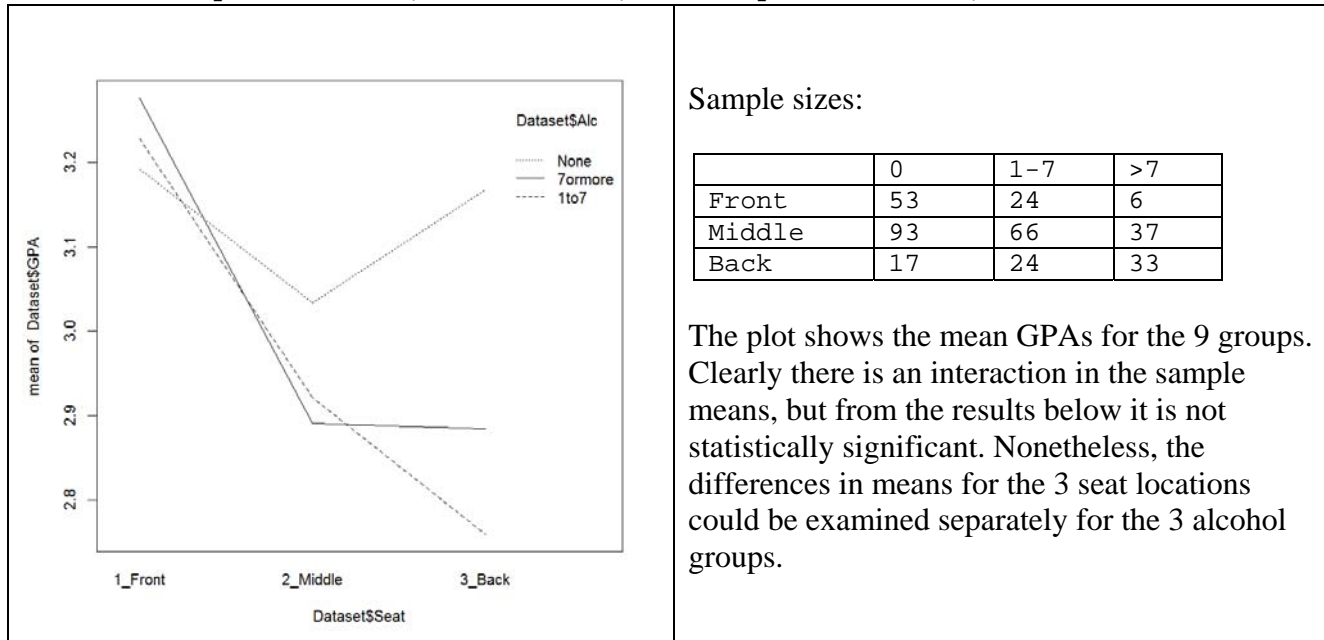
Factor B: Alcohol consumption, drinks/week, 0, 1 to 7, more than 7

Mean GPAs:

	0 drinks	1 to 7/week	More than 7/week
Front	3.2	3.23	3.27
Middle	3.03	2.92	2.89
Back	3.17	2.76	2.88

Cell means plot:

```
interaction.plot(Dataset$Seat, Dataset$Alc, response=Dataset$GPA, fun=mean)
```



Using partial sums of squares (also known as Adjusted SS; Type III SS in SAS):

```
> AnovaModel.3 <- (lm(GPA ~ Seat*Alc, data=Dataset))
```

```
> anova(AnovaModel.3, type = 3)
```

Anova Table (Type III tests)

Response: GPA

	Sum Sq	Df	F value	Pr(>F)
(Intercept)	1820.92	1	5916.5562	< 2e-16 ***
Seat	2.81	2	4.5584	0.01112 *
Alc	1.30	2	2.1163	0.12204
Seat:Alc	1.40	4	1.1333	0.34059
Residuals	105.87	344		

Using sequential sums of squares (this is the default in R, Type I SS in SAS):

```
> Sequential <- lm(GPA ~ Seat*Alc, data=Dataset)
```

```
> anova(Sequential)
```

[NOTE: Must use lower case anova]

Analysis of Variance Table

Response: GPA

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Seat	2	4.359	2.17932	7.0811	0.000969 ***
Alc	2	1.122	0.56091	1.8225	0.163175
Seat:Alc	4	1.395	0.34878	1.1333	0.340593
Residuals	344	105.872	0.30777		