Workshop 9.5a: ANCOVA

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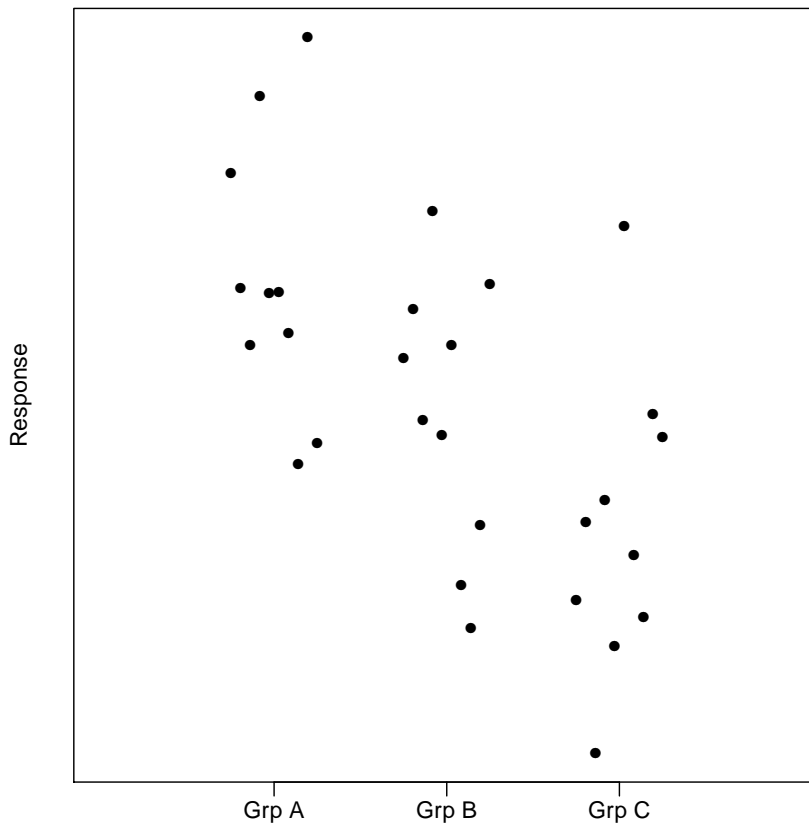*June 14, 2015*

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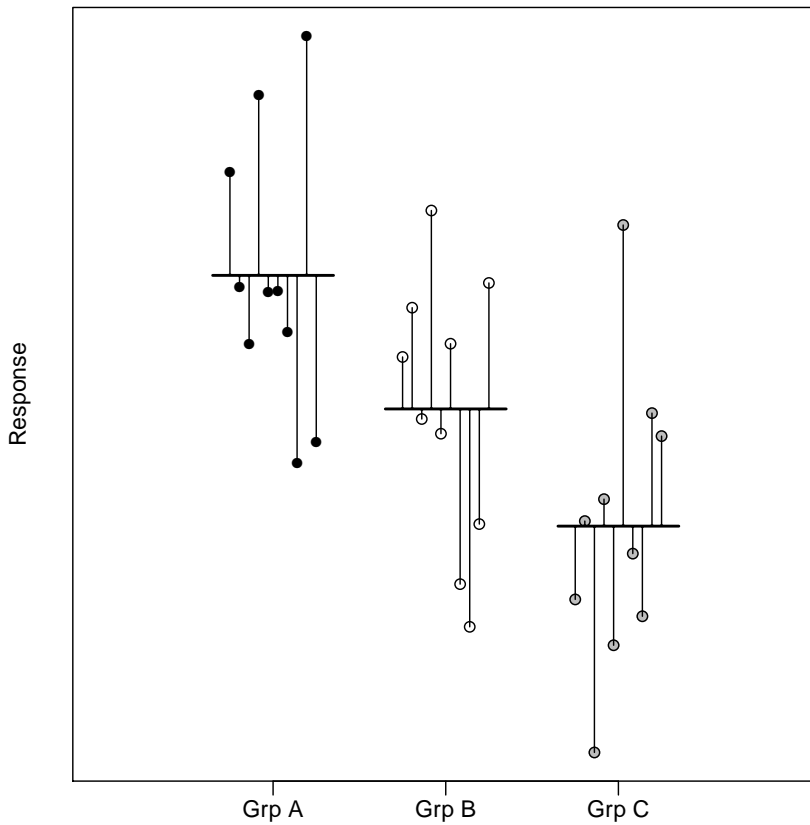
1. Analysis of Covariance

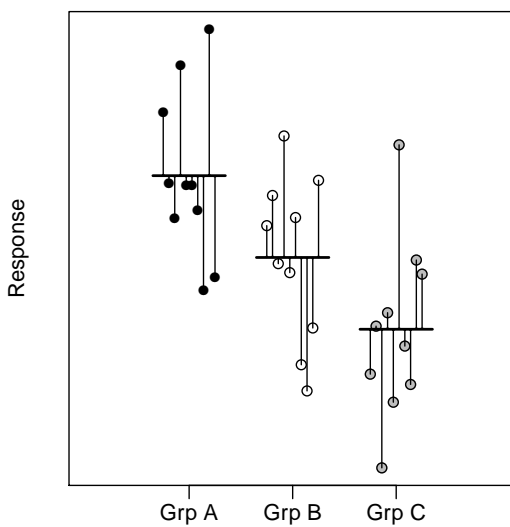### 1.1. Analysis of Covariance (ANCOVA)
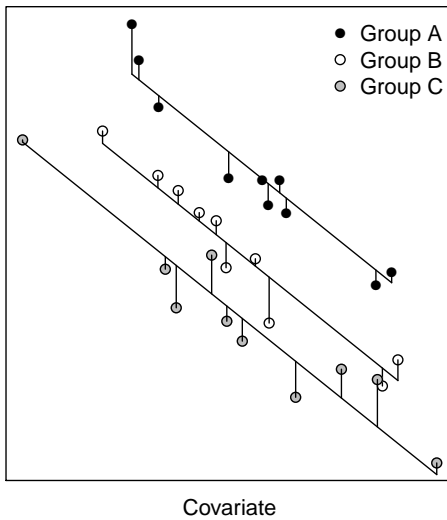
1.2. Analysis of Covariance (ANCOVA)

1.3. Analysis of Covariance (ANCOVA)

- add continuous **covariate**

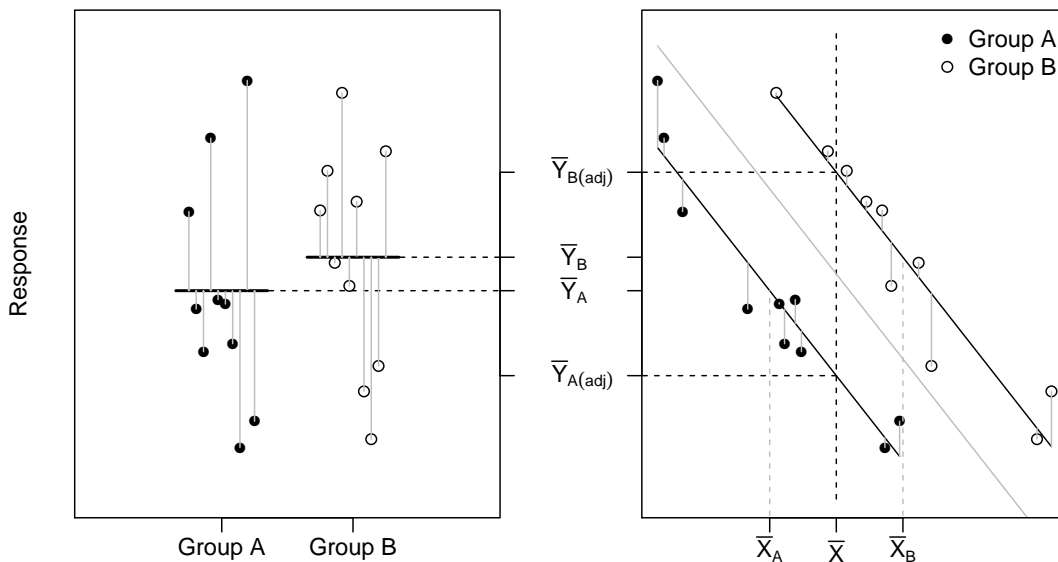 - reduce **unexplained** variance
  - increase **power** of test

0.4

0.4

Covariate

1.4. Analysis of Covariance (ANCOVA)

1.5. Analysis of Covariance (ANCOVA)

1.5.1. Assumptions

1. Normality (residuals)

2. Homogeneity of variance (residuals)

3. Independence

4. **Homogeneity of slopes**

1.6. Homogeneity of Slopes
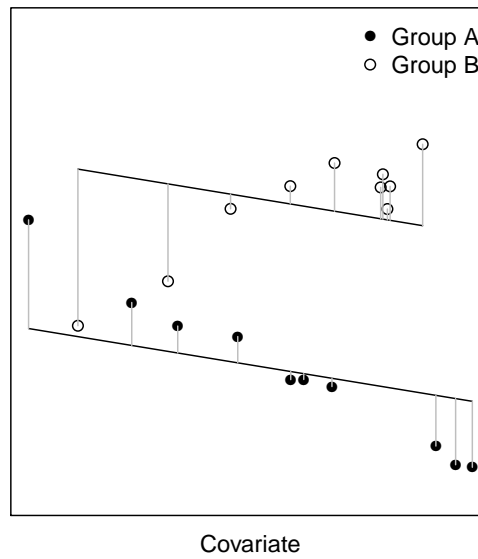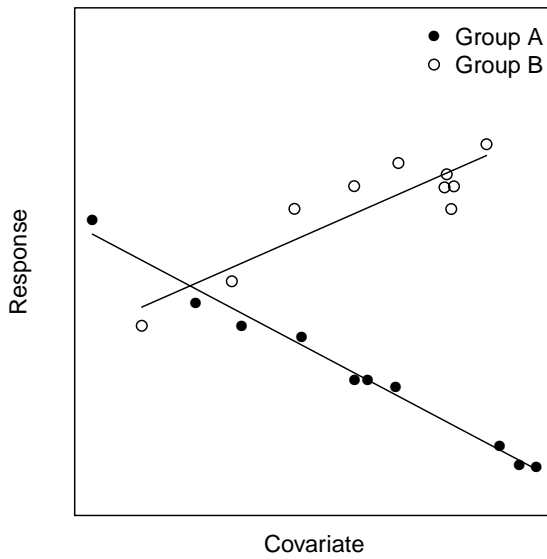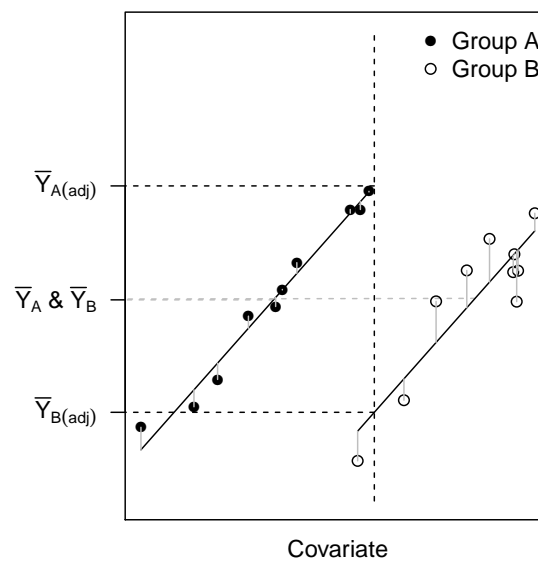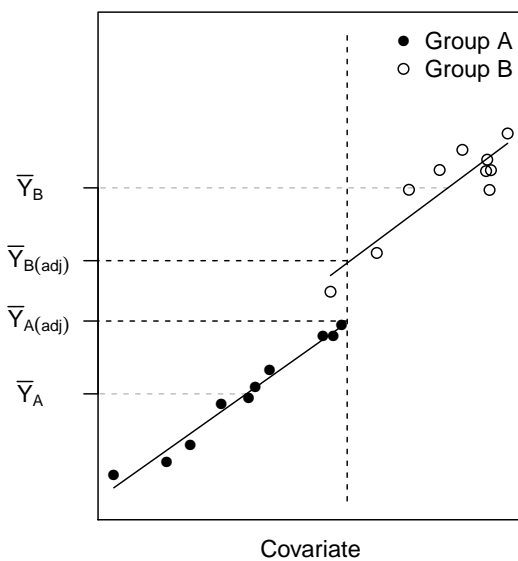

- no interaction effects

1.7. Analysis of Covariance (ANCOVA)

1.7.1. Assumptions

1. Normality (residuals)

2. Homogeneity of variance (residuals)

3. Independence

4. **Homogeneity of slopes**

5. **Similar covariate range**

1.8. Covariate range

1.9. Analysis of Covariance (ANCOVA)

1.9.1. Design balance

- ANCOVA designs are inherently **imbalanced**
- Need to use **Type II** or **III SS**

1.10. Analysis of Covariance (ANCOVA)

1.10.1. Offsets

- Standardize the response for a covariate
- Does not cost a degree of freedom

2. Worked Examples

2.1. Worked Examples

```
> partridge <- read.csv('../data/partridge1.csv', strip.white=T)
> head(partridge)
```

```
  TREATMENT THORAX LONGEV
1     Preg8   0.64     35
2     Preg8   0.68     37
3     Preg8   0.68     49
4     Preg8   0.72     46
5     Preg8   0.72     63
6     Preg8   0.76     39
```