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The *R* Workshop


Applying the Integrated Suite of Software
Facilities for Statistical Computing and Graphics

University of Georgia
Department of Workforce Education, Leadership, and Social Foundations
College of Education Research Office




January 23-January 24, 2012

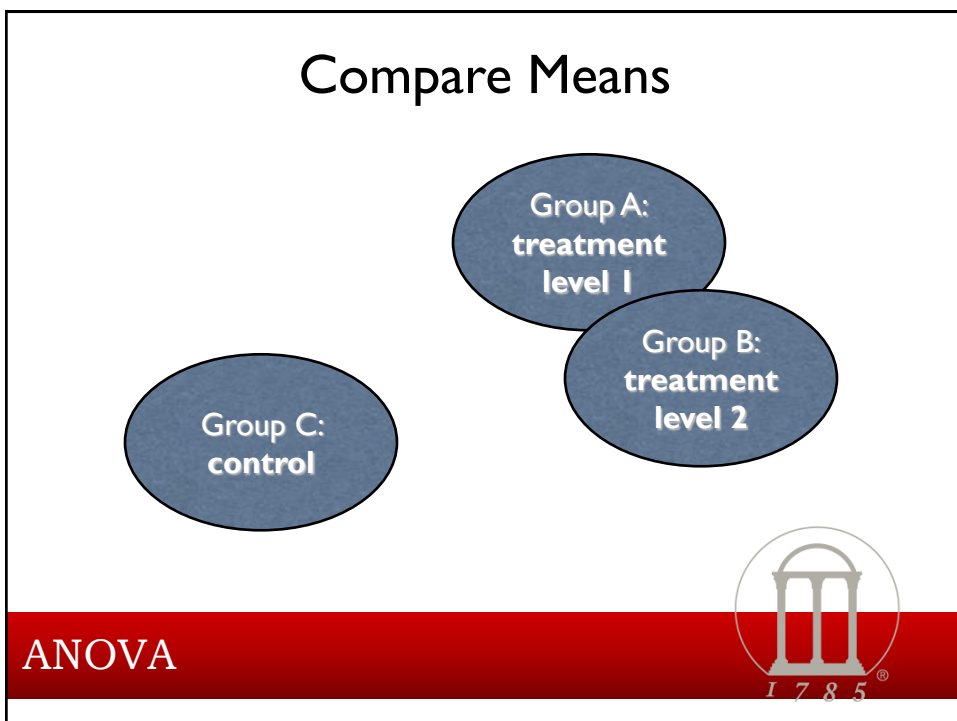
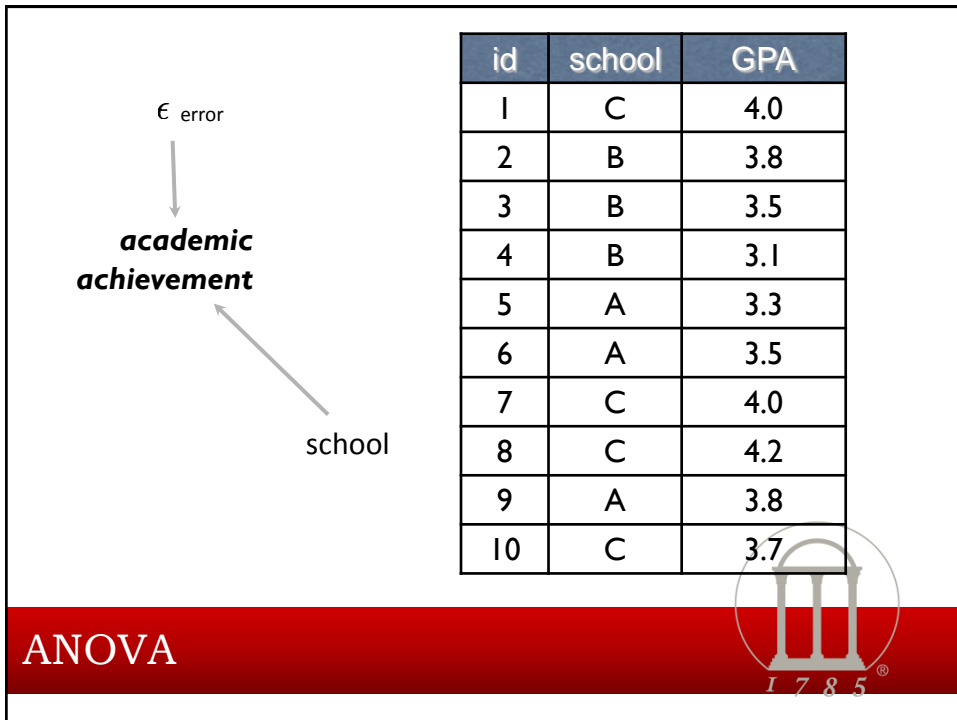
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8. Analysis of Variance (ANOVA)

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One-way ANOVA
Two-way ANOVA
Multi-way ANOVA

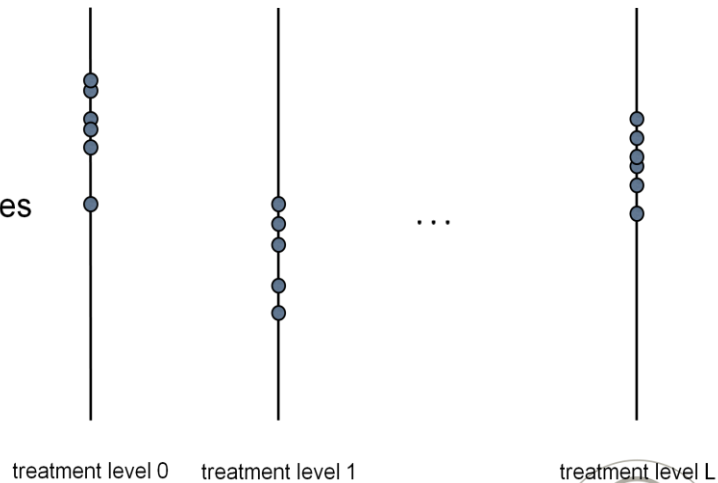
Treatment level

Treatment effect
main effect
interaction

ANOVA

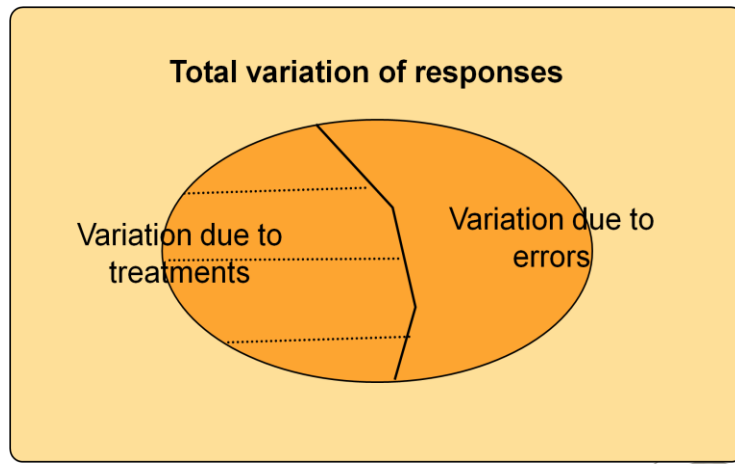


responses



ANOVA





ANOVA



```
school <- c(3, 2, 2, 2, 1, 1, 3, 3, 1, 3)
school <- factor(school, labels=c("A", "B", "C"))
y <- c(4.0, 3.8, 3.5, 3.1, 3.3, 3.5, 4.0, 4.2, 3.8, 3.7)
boxplot(y~school)
```

```
# ANOVA
res <- lm(y~school)
anova(res)
summary(res)
pairwise.t.test(y, school, p.adj="bonferroni")
res <- aov(y~school)
TukeyHSD(res)
```

```
# Kruskal-Wallis test
kruskal.test(y~school)
```

ANOVA



```
# Two-way ANOVA

# Heart rate after administration of enalaprilate
library(ISwR)
attach(heart.rate)
heart.rate
anova(lm(hr~subj+time))

# Nonparametric counterpart
friedman.test(hr~time|subj)
```

ANOVA

