

Analysis of Variance

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History of the ANOVA



- Invented by Sir Ronald Fisher
- Statistician and geneticist
- Knighthood bestowed for work in statistics
- Approximately 1920

A whole family of tests

- ANOVA - analysis of variance
 - One way
 - Two way
- ANCOVA - analysis of covariance
- MANOVA - multiple analysis

What does it do?

- Similar to the t-test
- Compares means between groups
- Unlike the t-test, it can compare multiple groups
- Computes the F-statistic
 - Named after Fisher
- “Computed F” is compared to “critical value of F” to determine significance

Here’s the general idea

- Start with a null hypothesis
 - There is no difference in means. It’s just error.
- The alternate hypothesis
 - There is a difference in means, and not likely to be caused by error.
- Calculate the F-statistic using a one-way ANOVA

continued

- Look at p to determine if F is significant or use tables in a statistics book
 - If yes, something is significantly different, but we don’t know who or what it is.
 - If no, nothing is significantly different
- Let’s try the ANOVA applet linked from web site

So how do we tell which is significant?

- Follow up the ANOVA with another test by John Tukey.
- It's the HSD test - or "honestly significantly different" test

Let's try one!

- Instructor Reputation and Teacher Ratings
 - Linked from class web site
- Download the new data set from class web site to use with SPSS

Small group activity

- You and the folks at your table go bowling
- Write down bowling scores
- Enter into SPSS
- Run one-way ANOVA and Tukey to determine if anyone is statistically significantly different

ANOVA in writing

- Use PsycInfo to find a paper that used ANOVA
- Personality Indicators and Emergency Permit Teachers' Willingness to Embrace Technology by Sharon M. Chambers
 - Available from PsycInfo