# ANOVA - STAT110 Otago

## Students also viewed

:at key signs

eacher 8 terms

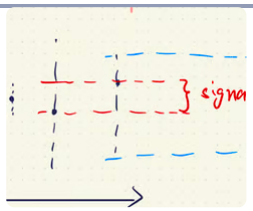
CharlieSten123 Preview

Hypothesis Testing Overview

16 terms

claudiacampbell_ Preview

## Terms in this set (18)

| | |
|---|---|
| ANOVA definition | abbr. of *analysis of variance*<br><br>*methods for comparing means of continuous responses between multiple groups* |
| F-ratio | **signal/noise**  |
| reasons why using "2+2+2=3" is *undesirable* | *It's **more work than we need to do**. Three tests may not seem too bad, but to **compare 10 groups we would have to do 45 different pairwise t-tests.***<br><br>*It can lead to lots of **false positive results**. Every test has the potential to incorrectly reject H0; i.e. falsely identify a difference between a pair of groups. If we do lots of tests then we risk generating lots of false positives.* |

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| ANOVA *model* | ***μ_i i****s the true* ***mean response*** *for the ith group at the population level.*<br>***e_ij*** *is the error term for the jth response in the ith group.*<br>*The error terms are assumed to be independent, and to follow a N(0, σ2) with constant variance.*<br>*The number of different groups is denoted K, and the number of responses in the ith group is denoted ni .* |
| est. mean for ANOVA | the "." = est. value |
| *sample mean for the ith group* | $\frac{1}{n_i}\sum_j$ |
| [NNTM] formula for *residual sum of squares in ANOVA* | $SS = \sum_{i=1}^{K}\sum_{j=1}^{n_i}(y_{ij} - \hat{\mu}_i)^2$<br>$= \sum_{i=1}^{K}\sum_{j=1}^{n_i}(y_{ij} - \bar{y}_{i\cdot})$ |
| [NNTM] *Total sum of squares in ANOVA* | $= \sum_{i=1}^{K}\sum_{j=1}^{n_i}(y_{ij}$ |
| *y..* | *is the sample mean overall the data* |
| [NNTM]formula for GSS in ANOVA | *GSS = TSS - RSS*<br>*GSS can be interpreted as a measure of the variation that is explained by differences between groups.* |

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| *Setting up the hypotheses to test ANOVA* | **ıothesis** will be the 'no dif<br>$H_0: \mu_1 = \mu_2 = \cdots = \mu_K$<br>ıply an expression that the<br>ı: $\mu_1, \mu_2, \ldots, \mu_K$ not all ec |
| Equation for F statistic | $\frac{GSS/(K-}{RSS/(n-}$ |
| *GMS* | *GSS/(K - 1) is the group mean square* |
| *RMS* | *RSS/(n - K) is the residual mean square* |
| what situations would let H_0 fail | *Large differences between group means*<br>*Relatively large value of GSS*<br>*Large value of F* |
| ANOVA table | SS DF<br>$GSS$ $K-1$ $GI$<br>$RSS$ $n-K$ $RI$<br>$TSS$ $n-1$ |
| p-value is ( ) censored | p-value is right censored |
| *blocking variable* | A second treatment variable that when included in ANOVA analysis will have the effect of **reducing the SSE term (noise).** |