Types of Statistical Inference

Single categorical variable

One-proportion z-interval and test (Chapters 19-21)

Single quantitative variable

One sample t-interval and test (Chapter 23)

Two quantitative variables

Regression inference (Chapter 27)

Two categorical variables

Two categories each:
Two proportion z-interval and test (Chapter 22)

More than two categories each:
Chi-square tests (Chapter 26)

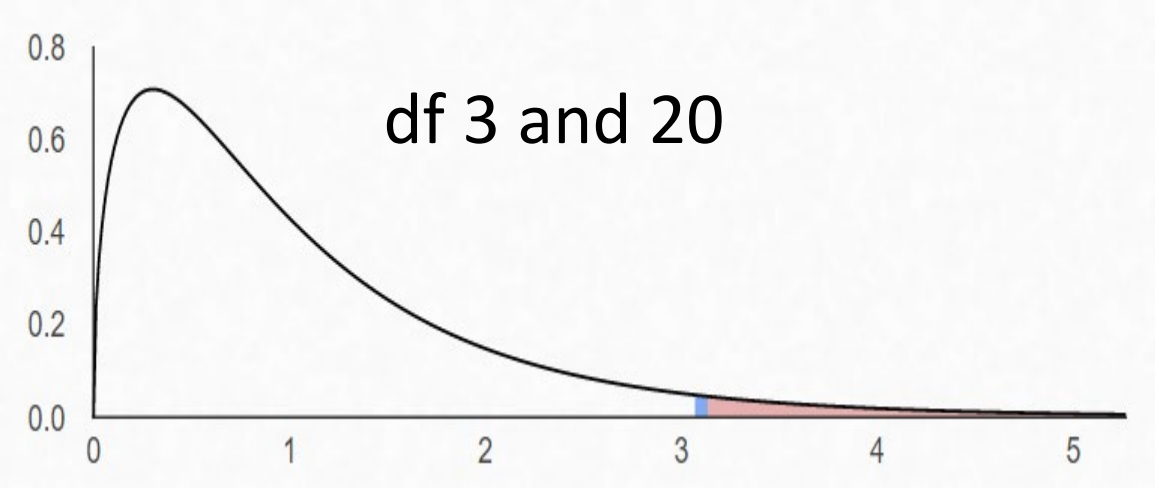
One categorical, one quantitative variable

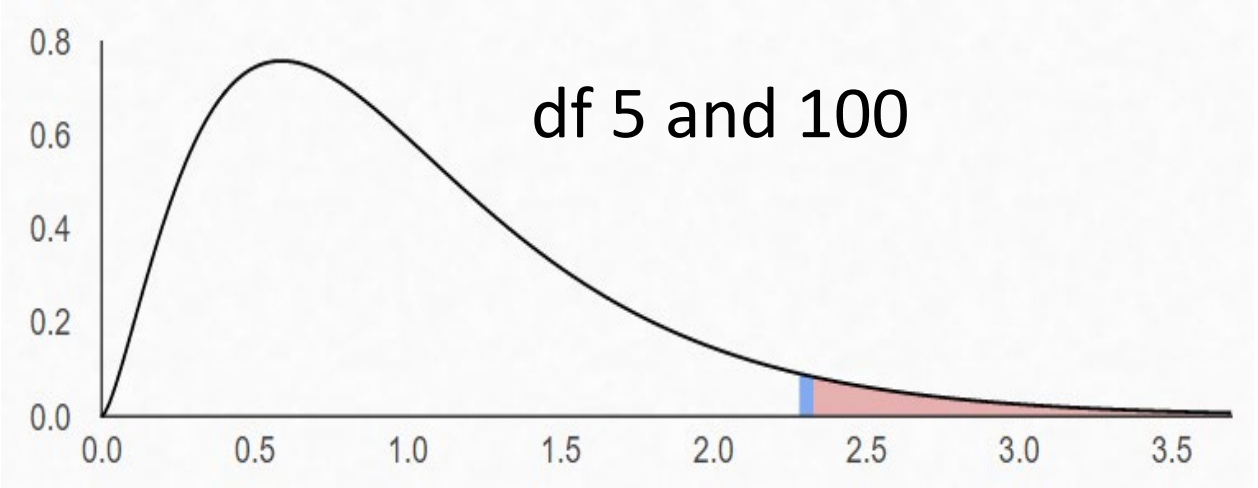
Two categories:
2-sample t-interval and test (Chapter 24)
Paired t-interval and test (Chapter 25)

More than two categories:
ANOVA test (Chapter 28)

ANOVA (Analysis Of Variance) test

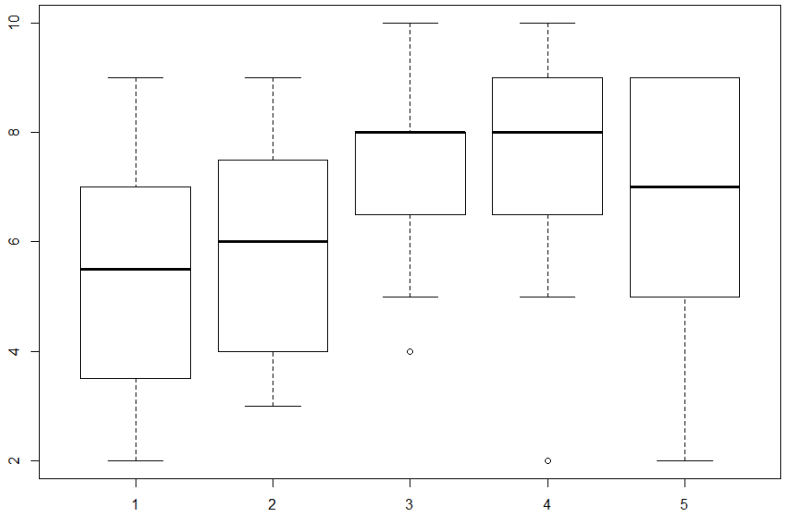
- Uses the F (Fisher) distributions
- Since the distribution is right-skewed, there's no confidence interval, only a one-sided hypothesis test.
- Two degrees of freedom, the **numerator df and denominator df**





ANOVA test

1. H_0: Means are the same between groups
   H_A: Means are different between groups
2. Find the F-score of the sample.
3. Convert the$F$-score to a P–value.
4. Compare the P-value to α=.05.
5. Reject the null hypothesis if the P-value is less than α. Report the P-value of the test.



The **error mean square** $\boldsymbol{MS_E}$ is the variance within categories
The **treatment mean square** $\boldsymbol{MS_T}$ is the variance between categories
If the null hypothesis is true, $MS_T = MS_E$. If the null hypothesis is false, $MS_T > MS_E$

$$\mathrm{F} = \frac{MS_T}{MS_E}$$

Degrees of freedom

numerator $df = num.of\ categories - 1$
denominator $df = num.of\ cases - num.of\ categories$