## Intro

My background

### Statistical Tools

R, SAS, SPSS

### R help

R manuals and tutorials

Use google a lot

## Basic Concepts – Basic Chi –Square Analysis

Chi-square (simplecointoss.csv)

Do on excel first?

Do on R

Go over analysis

Type 1 error (p-value, alpha)

Type 2 error (power, beta)

Degrees of freedom

Interpretation.

Chi square (simpledicetoss.csv)

Emphasize DF

Chi-square (two dice)

Do wrong

Show how to generate a distribution

Redo analysis

Contingency table (HairEyeColor)

Degrees of freedom

How to compute expected and residuals

Parametric Statistics

Descriptive stats

Normal Distribution

Skewness, Leptokurtosis, Platykurtosis

Mean, median, variance, SD, SE

T-test (CO2)

t.test(CO2$uptake~CO2$Treatment)

Assumptions (What do we really care about)

Equal variance

heteroscedasticity

Introduce transformations here

Log (when multiplicative factors are in play)

Arcsine (proportional data)

Squareroot (count data)

Paired T-test

Regression

Plot residuals and qqnorm of residuals.

Cars

carsreg <- lm(cars$dist~cars$speed) > plot(cars$speed, cars$dist)

> plot(cars$speed, residuals(carsreg))

> logcarsreg <- lm(log(cars$dist)~cars$speed)

> plot(cars$speed, residuals(logcarsreg))

Old Faithful

Faithful has a double peak, but seems to regress well anyway

ofreg <- plot(faithful$waiting, faithful$eruptions)

> plot(faithful$waiting, residuals(ofreg))

ChickWeight is rough

Correlation

Trees

Cor(trees)

Cor.test(tress$*var*)

Emphasize correction for multiple tests

Anova (fancy anova)

Tooth growth is good

Chickweight is messy because its good.

*Name*  <- Aov(*model*)

Summary(*name*)

Plot(name)