Z-test ( is known): ; ; z N (0, 1);

One-sample t-test ( is unknown):; ; t ;

Independent Samples t Test: ; ; ;

Paired Samples t Test: , ; { , };

Effect size: ; 1-Sample t test: ; Indep Smp t test: ; Dep Smp t test: ; ANOVA: ; Correlation (coeff of determination): ; Regression: ; S: 0.2, M: 0.5, L: 0.8, for ANOVA (): S: 0.1, M: 0.25, L: 0.4

Power: 1-)= p (z= > ), assuming H1 is true. Type I error: ; C: # independent tests.

One-sample test of variance: Chi2 test:; 2-tailed critical value:

; ; =

2-sample tests of variance: ; ,

Using variances to answer questions about means (multiple groups): ANOVA: , , , , ; [] ;

Covariance: ;

Pearson product moment correlation coefficient: ; S: M: L=0.1: 0.3: 0.5 ; ; Estimated standard error of the correlation:

Correlation: test statistic for 1 sample: ; ; or: ;; for 2 independent samples:

Coefficient of determination: The proportion of variance that X and Y share. The amount of variance in Y that is explainable by X (or vice versa):

Regression: ; unstandard reg coeff: ;

Regression with standardized coefficients: ;

Regression variability: =>

Coefficient of determination (explained variation):

Coeff of multiple determination:

Adjusted (variation explained by only IVs that affect the DV):

; k: # predictors, n: # subjects

Standard error of estimate (a measure of accuracy of prediction by the model: SD of residuals) : ;

Standard error of slope (variation in slope due to sampling error): (used in t-test for hypothesis testing of slope: )

Standard error of intercept: (used in t-test of intercept: )

Regression Assumptions: 1.\* Independence (tough to test. assumed!) => violation: impacts SE of model. 2.\* Linearity: Y vs X (simple regression), residuals vs each X, residuals vs => violation: Bias intercept & slope, change in Y not constant and depends on X => Polynomial Regression, testing of Higher Order terms (). Log, Inverse, or Box-Cox transform: and Box-Tidwell transform: . 3.\* Homoscedasticity: Y vs X (simple), residuals vs each X, residuals vs , Levene’s test (not reliable for large n) => violation: Bias in SEE, inflate SE & type II error, non-normal conditional distributions => Weighted Least Square estimation. Sqrt<Log<Inverse. 4.\* Normality: histogram of residuals, PP/QQ plot of residuals, skewness>, KS test & Sharpiro-Wilk test (not reliable for n>50) => violation: Less precise slope, intercept and => Log transform for pos skewness, Square Root for pos/neg skewness. Sqrt<Log<Inverse.

Partial Correlation: , , , df= n-3

Semi-partial correlation (residualized correlation):

Partial F-test (: ; ; ;

CI for , if n>60 : ;

Diagnosing outliers in residuals: look for cases with values in excess of ±2 or ±3.

Leverage: A measure of each case's "pull" on the regression line: ; Centered leverage: ; Look for leverage > 2(k+1)/n or centered leverage> 2k/n.

Influence: Look for Standardized DFBeta > or >1, , Cook’s distance d > 1.

Multicollinearity (predictors are correlated): highly significant and non-significant reg coeffs, large SE of slopes. ; is the coeff of determination for the reg of the kth predictor on all other predictors. : how “inflated” the variance of the reg coeff is compared to what it’d be if the variable was uncorrelated with any other IV. Tolerance < 0.1 or .2775 (for R = .85) OR VIF>10 or 3.604 => multicollinearity. => Centering predictors (using instead of X), dropping problematic predictors, combining correlated predictors, ridge regression.