EXCEL TUTORIAL:

PAIRED SAMPLES *t* & WILCOXON SIGNED RANKS TESTS

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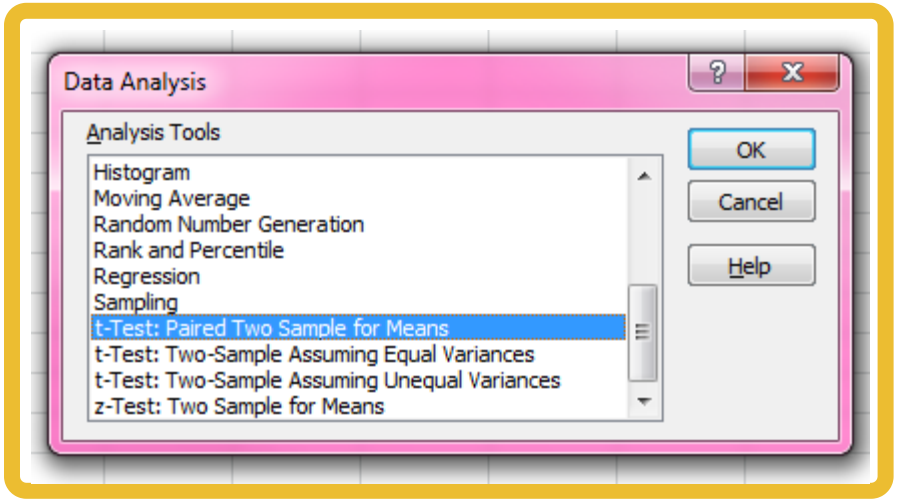
parametric analysis for within-subjects designs

PAIRED SAMPLES *t* TEST

COMPARE MEANS (PAIRED SAMPLES *t*)

Use the ***DataAnalysis*** button on the *Data* tab to select the ***t-Test :Paired Two Sample for Means*** test, click on ***OK***.

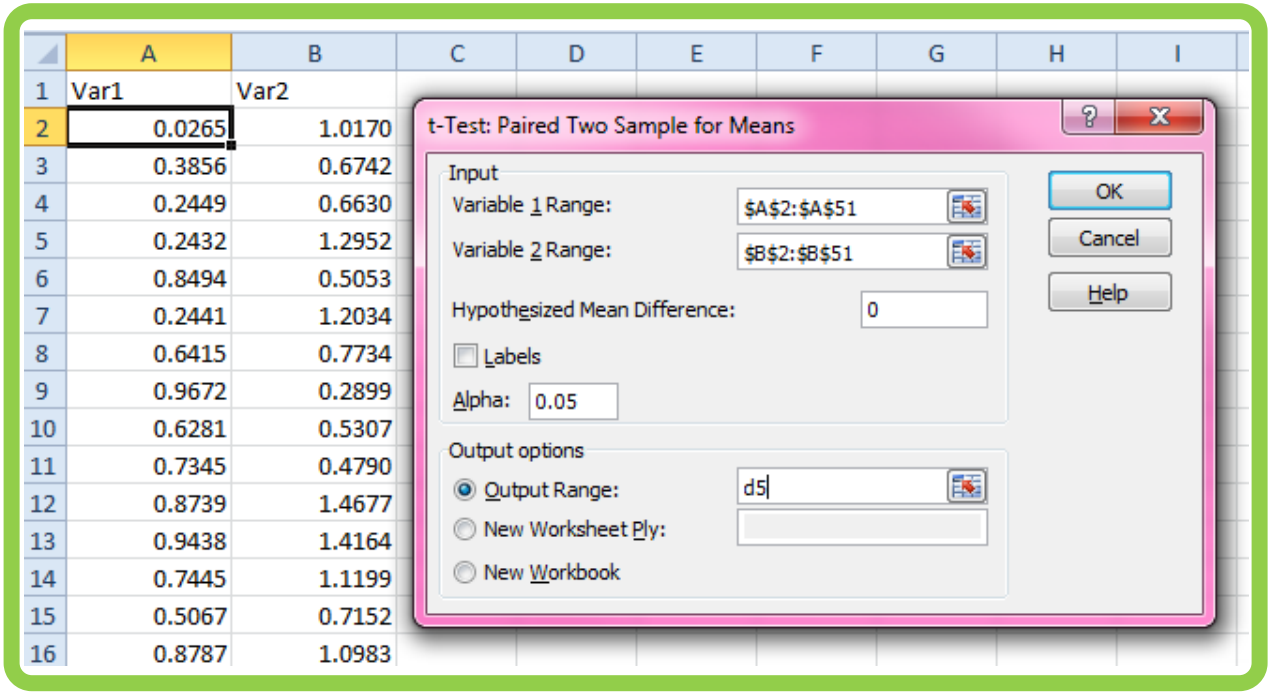


Enter the data range for the dependent variable into the ***t-Test: Paired Two Sample for Means*** dialogue box.

Variable 1 = cells of DV which correspond to time1/group1

Variable 2 = cells of DV which correspond to time2/group2

Specify hypothesized mean difference (H_0), alpha level, output location, click on ***OK***.



COMPARE MEANS (PAIRED SAMPLES *t*)

Inspect output to determine if the means are significantly different from each other.

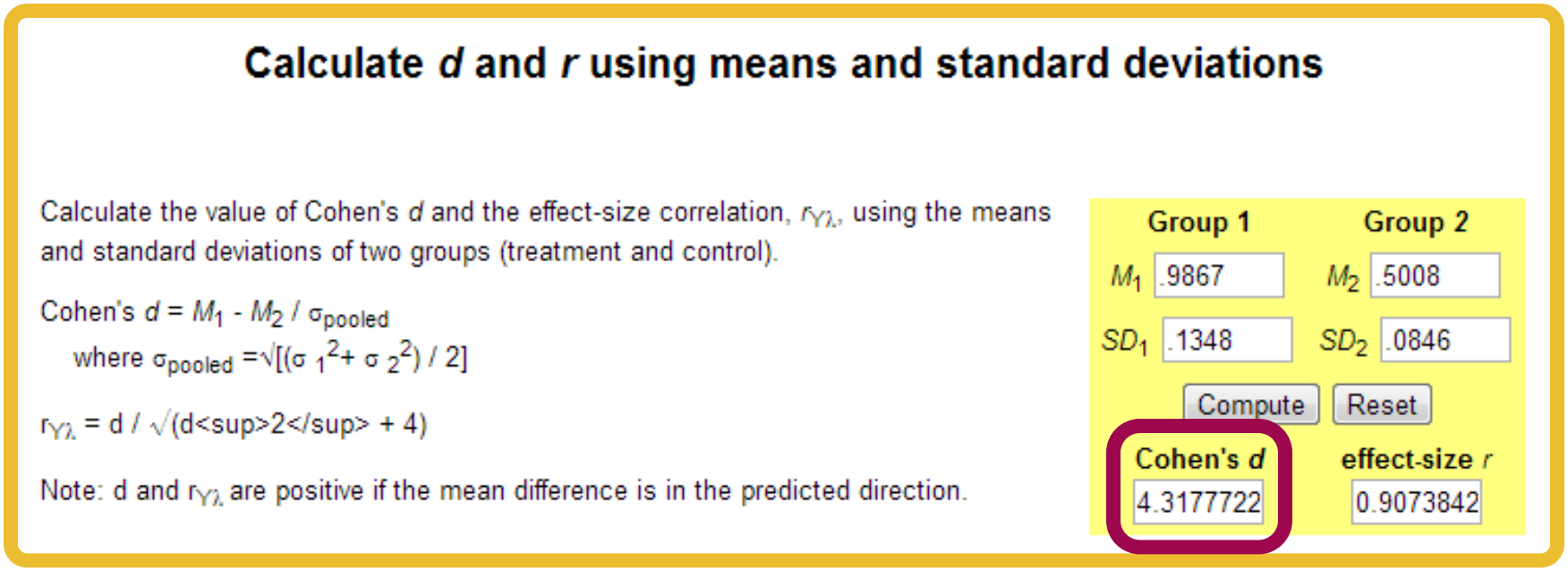
If $p > \alpha$, *t* test is not significant ,and null hypothesis should be retained.

t-Test: Paired Two Sample for Means		
	Variable 1	*Variable 2*
Mean	0.500772757	0.986656537
Variance	0.0845837	0.13479887
Observations	50	50
Pearson Correlation	0.052675192	
Hypothesized Mean Difference	0	
df	49	
t Stat	-7.530894641	
P(T<=t) one-tail	5.01483E-10	
t Critical one-tail	1.676550893	
P(T<=t) two-tail	1.00297E-09	
t Critical two-tail	2.009575237	

CALCULATE EFFECT SIZE (COHEN'S *d*)

Use the online effect size calculator to calculate the Cohen's *d* effect size for the paired samples *t* test statistic

http://www.uccs.edu/~lbecker/



Calculate *d* and *r* using means and standard deviations

Calculate the value of Cohen's *d* and the effect-size correlation, $r_{Y\lambda}$, using the means and standard deviations of two groups (treatment and control).

Cohen's $d = M_1 - M_2 / \sigma_{pooled}$

where $\sigma_{pooled} = \sqrt{[(\sigma_1^2 + \sigma_2^2) / 2]}$

$r_{Y\lambda} = d / \sqrt{(d^2 + 4)}$

Note: d and $r_{Y\lambda}$ are positive if the mean difference is in the predicted direction.

Group 1		Group 2	
M_1	.9867	M_2	.5008
SD_1	.1348	SD_2	.0846

Compute Reset

Cohen's *d*	effect-size *r*
4.3177722	0.9073842

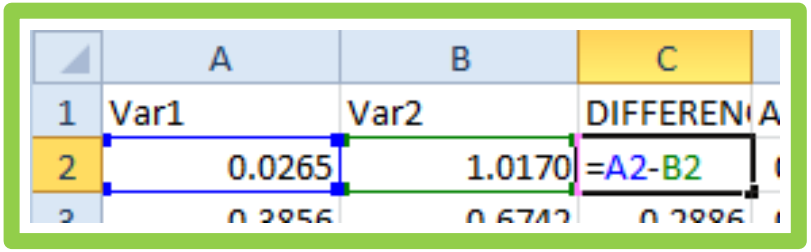
nonparametric analysis for within-subjects designs

WILCOXON SIGNED RANKS TEST

COMPARE DIFFERENCE RANKS (WILCOXON)

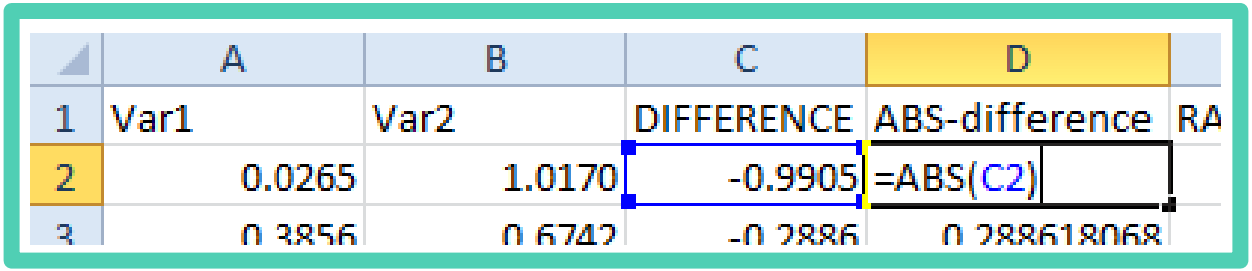
Step 1: Calculate difference scores for the two variables

=CELL1-CELL2



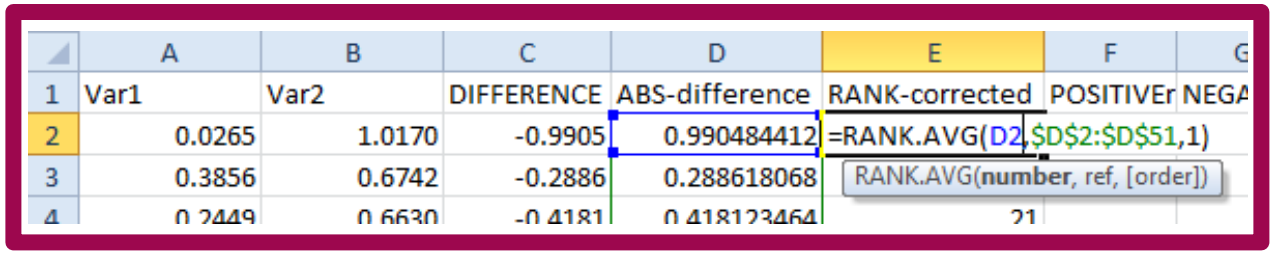
Step 2: Calculate absolute values of difference scores

=ABS(DIFFERENCESCORE)



Step 3: Calculate ranks for absolute values of difference scores

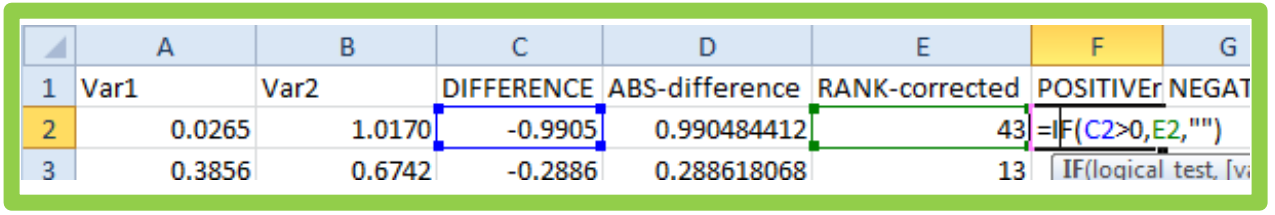
=RANK.AVG(CELL,RANGE,1)



COMPARE DIFFERENCE RANKS (WILCOXON)

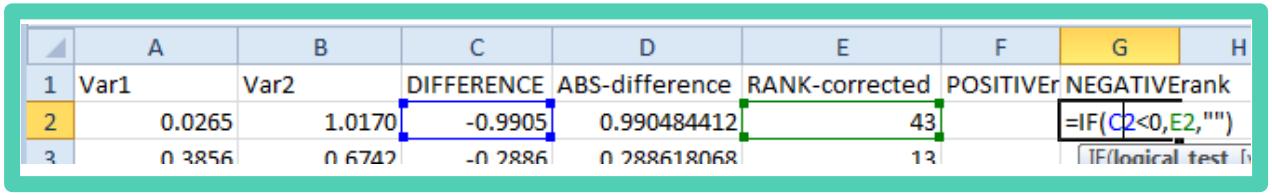
Step 4: Create column for ranks of positive difference scores

=IF(DIFFERENCESCORE> H0VALUE,CELL,“”)



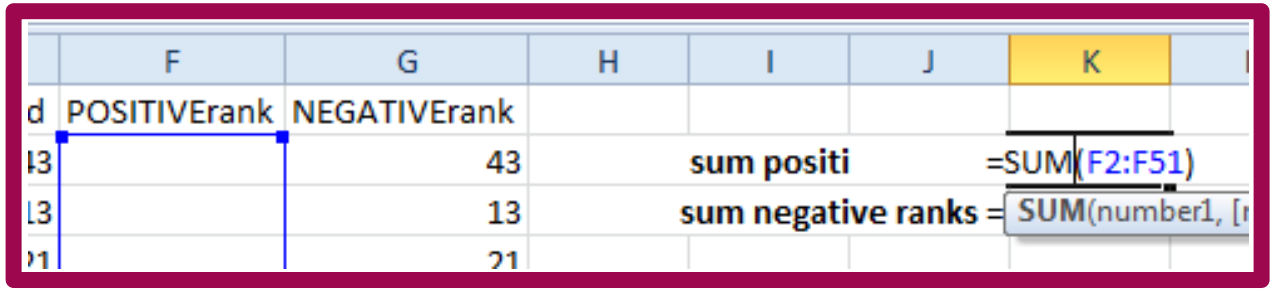
Step 5: Create column for ranks of negative difference scores

=IF(DIFFERENCESCORE< H0VALUE,CELL,“”)



Step 6: Sum positive ranks, sum negative ranks

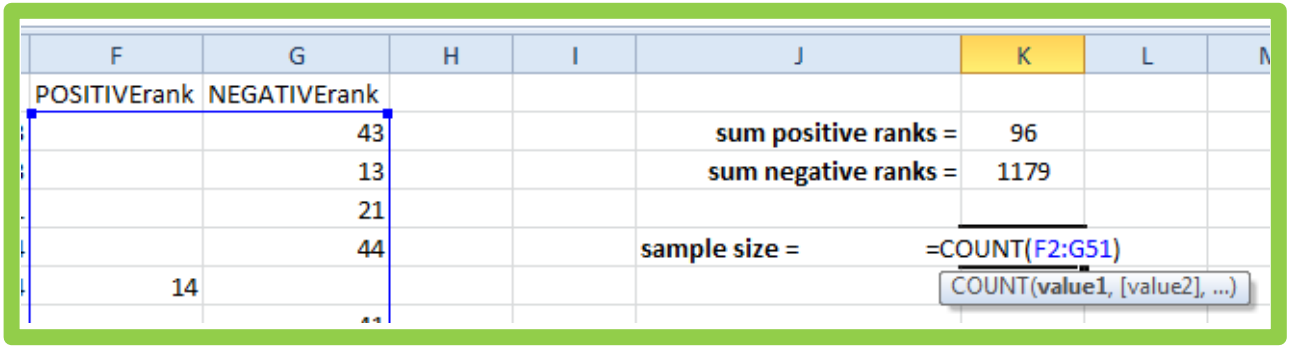
=SUM(RANGE)



COMPARE DIFFERENCE RANKS (WILCOXON)

Step 7: Calculate sample size of ranks in positive and negative values columns

=COUNT(RANGE)



Step 8: Compare smaller of two ranked sum values and sample size to the ***Wilcoxon Distribution Table*** of critical values

sum of ranks (smaller)	96	1179
sample size	50	

p < 0.01 (obtained from critical value table)