Larger Tables for *Student Friendly Statistics:*

Standard Deviation,

t-test,

ANOVA

Good for overheads or for practicing computation. Each statistic has a two page spread; lay them out side-by-side for easy viewing.

Standard Deviation

Calculating the Standard Deviation (SD) of a Sample

1. Create squared deviations within a table of 4 columns:
   A. Put the scores in column 1 and the group means in column 2.
   B. Calculate the deviations from the mean and put them in column 3.
   C. Square each deviation and put these squared deviations in column 4.

2. Sum the squared deviations.

3. Divide by n-1 to get the mean squared deviation. This is called the **variance**.

4. Unsquare the variance, by taking its square root.

Table 3-8. A table ready for calculating Standard Deviation.

	Experimental Group			
	1. Score	2. Mean	3. Deviation	4. Squared Dev.
X_1				
X_2				
X_3				
X_4				
X_5				
X_6				
Sum of Squares			=	
Variance			$= SD^2 =$	
Standard Deviation			$= SD =$	

t-test

Calculating the value of *t*

1. Make a table like 7-1, with five columns (one for participant numbers) and lots of rows (enough for each participant plus seven additional rows).
2. Calculate the variances (the SD's squared).
   (Reminder of how to calculate variances:
   A. Scores in column 1, group means in column 2, deviations in column 3, squares in column 4.
   B. Sum squared deviations and then C. divide by n-1.)
3. At bottom of table, calculate IV Effect
   and Standard Error of Difference, where

$$SE = \sqrt{\frac{SD^2_1}{n_1} + \frac{SD^2_2}{n_2}}$$

4. *t* = IV Effect/Standard Error of Difference.

Table 7-1. A table for calculating the *t*-test.

	Control Group			
	1.Score	2.Mean	3.Deviation	4.Square
x_1				
x_2				
x_3				
x_4				
x_5				
x_6				
Sums		=		=
Variance	$= SD^2 =$			=

	Experimental Group			
	1.Score	2.Mean	3.Deviation	4.Square
x_1				
x_2				
x_3				
x_4				
x_5				
x_6				
Sums		=		=
Variance	$= SD^2 =$			=

Differences Between Groups
IV Effect
SEdiff
t

Analysis of Variance

How to Calculate *F* for a Between-Participant Design

1. Get SUMS OF SQUARES from the DEVIATION TABLE

A. Make a deviation table like Table 8-10 (next page). Have enough rows for the participants, the sample means, and the grand mean. Have 10 columns. The first column, marked 0, should have room for the participant numbers and the original scores (X's).

B. Calculate means for each sample and the grand mean and enter in column 0.

C. Using the means, form the deviations in columns 1, 4, and 7, and put the results in columns 2, 5, and 8.

D. Square the deviations and enter into columns 3, 6, and 9.

E. Sum the deviations in columns 3, 6, and 9 to get Sums of Squares. Check that,
Total = IV + Error.

2. SUMMARIZE IN SOURCE TABLE

A. Make a source table like Table 8-11 (next page) and enter the sums.

B. Calculate the *df*'s and enter them.

C. In each row, divide SS by *df* to get Mean Squares (MS).

D. Divide MS_{IV} by MS_{Error} to obtain *F*.

3. COMPARE TO $F_{critical}$

A. Get $F_{critical}$ from the *F*-table using the *df*'s.

B. Compare $F_{obtained}$ to $F_{critical}$ and make your decision.
Reject the null hypothesis if $F_{obtained} > F_{critical}$.
Accept the null hypothesis if $F_{obtained} \leq F_{critical}$.

Table 8-10. A Deviation Table for 2 samples of 6 participants.

	Sample One								
	TOTAL			**IV (BETWEEN)**			**ERROR (WITHIN)**		
0. Scores	1. Total Dev	2. Total Dev	3. Total Square	4. IV Dev	5. IV Dev	6. IV Square	7. Error Dev	8. Error Dev	9. Error Square
1.									
2.									
3.									
4.									
5.									
6.									
$\overline{X}_A$									
	Sample Two								
7.									
8.									
9.									
10.									
11.									
12.									
$\overline{X}_B$									
$\overline{X}_G$									
SUMS									

Table 8-11. A Source Table for any experiment with one IV.

Source	Sum of Square (SS)	*df*	MS	*F*-Obtained
IV/Between				
Error/Within				
Total (for checking)				