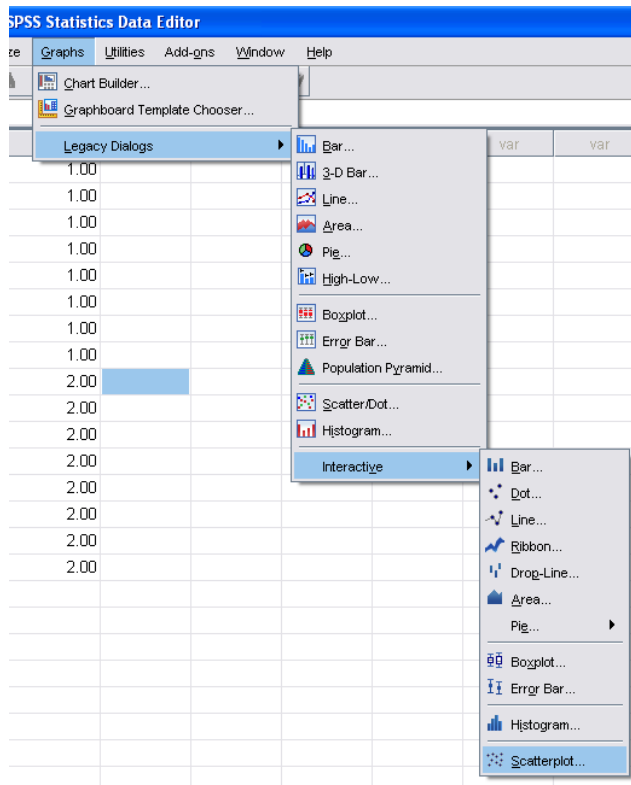
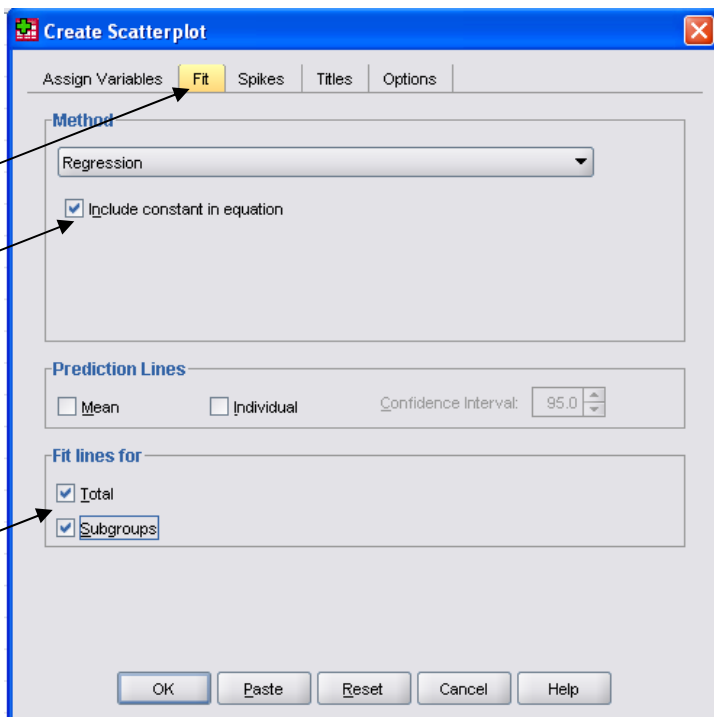
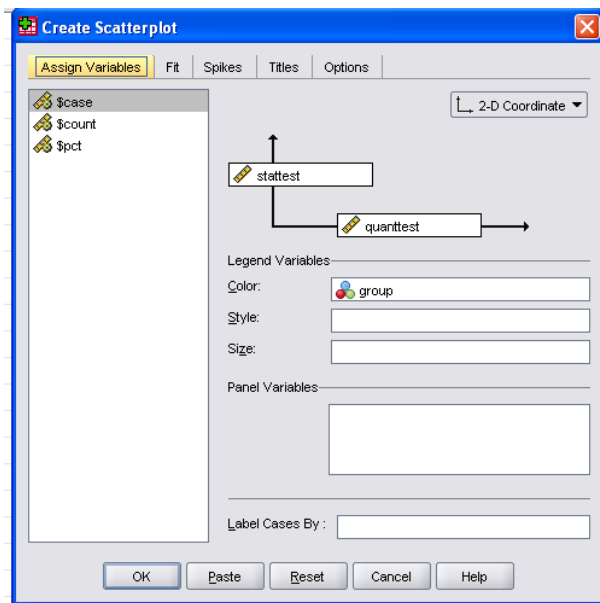


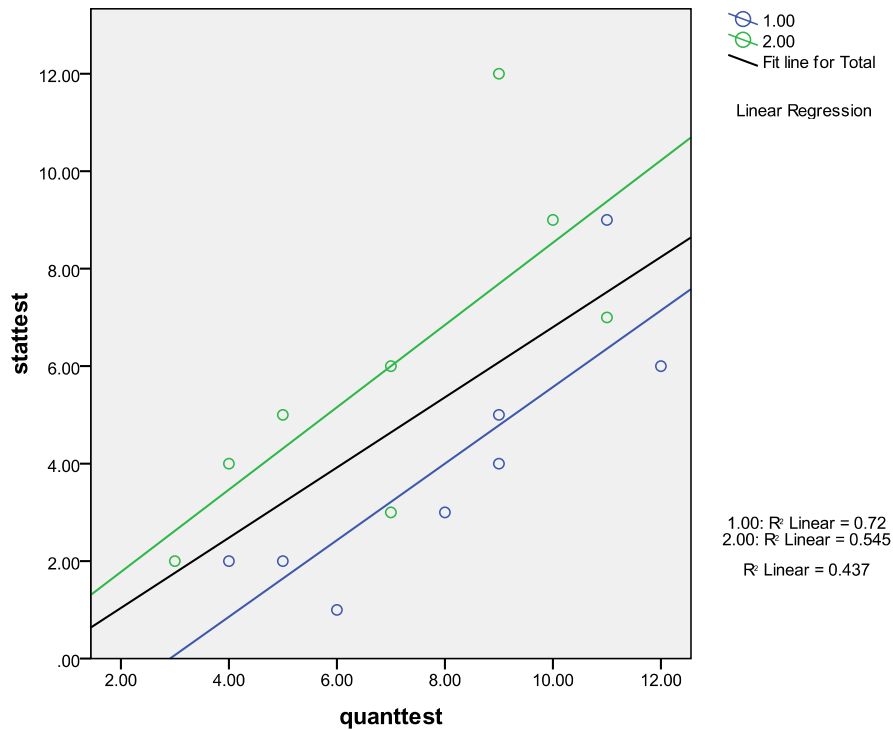
ANCOVA LAB 11/11/09

Prior to conducting an ANCOVA, it is imperative to review your data and test a few of the assumptions. First, we need to make certain that our covariate is linearly related to our dependent variable. If it isn't we should run a regular ANOVA.

1) Consider the relationship between the covariate and the dependent variable--plot the best fit line





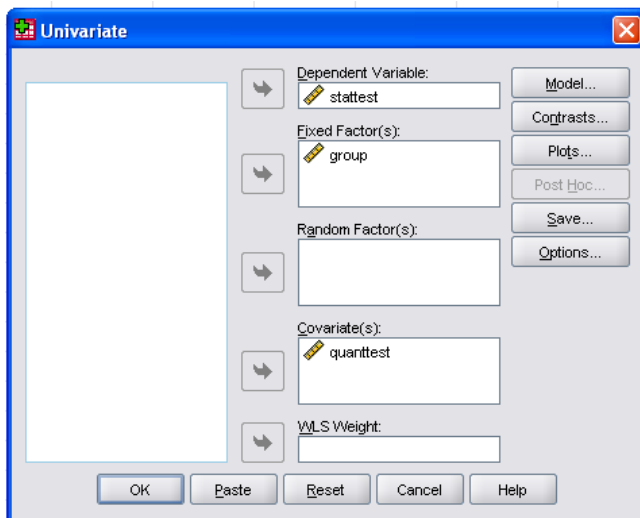


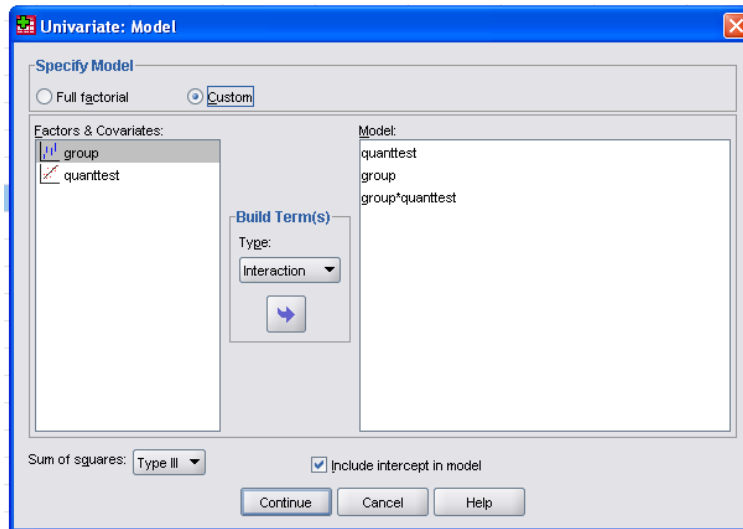
How can we tell we are all set with the covariate and dependent variable relationship?

What are the other regression lines telling us?

2) Test the Assumption of Equality of Slopes

General Linear Model>Univariate





Tests of Between-Subjects Effects

Dependent Variable: stattest

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	91.968 ^a	3	30.656	7.659	.004
Intercept	2.162	1	2.162	.540	.476
quanttest	75.749	1	75.749	18.925	.001
group	2.514	1	2.514	.628	.443
group * quanttest	.100	1	.100	.025	.877
Error	48.032	12	4.003		
Total	540.000	16			
Corrected Total	140.000	15			

a. R Squared = .657 (Adjusted R Squared = .571)

What line in the table are we concerned with? Conceptually, with respect to the model, why is this an important assumption? If our p value was significant, what would we do??

3) Run the ANCOVA

General Linear Model>Univariate

Univariate: Model

Specify Model

☐ Full factorial ☒ Custom

Factors & Covariates:

- group
- quanttest

Build Term(s)

Type: Interaction

Model:

- quanttest
- group

Sum of squares: Type III

☒ Include intercept in model

Continue Cancel Help

Univariate: Options

Estimated Marginal Means

Factor(s) and Factor Interactions:

- (OVERALL)
- group

Display Means for:

- group

☐ Compare main effects

Confidence interval adjustment: LSD(none)

Display

☒ Descriptive statistics

☒ Estimates of effect size

☐ Observed power

☐ Parameter estimates

☐ Contrast coefficient matrix

☐ Homogeneity tests

☐ Spread vs. level plot

☐ Residual plot

☐ Lack of fit

☐ General estimable function

Significance level: .05 Confidence intervals are 95.0%

Continue Cancel Help

Descriptive Statistics

Dependent Variable: stattest

group	Mean	Std. Deviation	N
1.00	4.0000	2.61861	8
2.00	6.0000	3.29502	8
Total	5.0000	3.05505	16

Tests of Between-Subjects Effects

Dependent Variable: stattest

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	91.868 ^a	2	45.934	12.407	.001	.656
Intercept	2.250	1	2.250	.608	.450	.045
quanttest	75.868	1	75.868	20.492	.001	.612
group	30.640	1	30.640	8.276	.013	.389
Error	48.132	13	3.702			
Total	540.000	16				
Corrected Total	140.000	15				

a. R Squared = .656 (Adjusted R Squared = .603)

Estimated Marginal Means

group

Dependent Variable: stattest

group	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1.00	3.592 ^a	.686	2.110	5.075
2.00	6.408 ^a	.686	4.925	7.890

a. Covariates appearing in the model are evaluated at the following values: quanttest = 7.5000.

What are we interested in here? What would we need to do if we had more than two treatment groups??

- 4) Final thought: If you are interested in finding the pooled regression slope that creates the marginal means...Include 'Parameter Estimates' under the options menu. Also use the 'compare means' menu option to obtain the mean of X per group and the grand mean of X.

$$\bar{Y}' = \bar{Y}_j - b_1(\bar{X}_i - \bar{X}_T)$$

$$\text{adjY} = 4.0 - (.816 * (8 - 7.5)) = 3.592$$

Descriptive Statistics

Dependent Variable: stattest

group	Mean	Std. Deviation	N
1.00	4.0000	2.61861	8
2.00	6.0000	3.29502	8
Total	5.0000	3.05505	16

Report

quanttest

group	Mean	N	Std. Deviation
1.00	8.0000	8	2.82843
2.00	7.0000	8	2.87849
Total	7.5000	16	2.80476

Parameter Estimates

Dependent Variable: stattest

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval		Partial Eta Squared
					Lower Bound	Upper Bound	
Intercept	.289	1.433	.202	.843	-2.807	3.386	.003
quanttest	.816	.180	4.527	.001	.426	1.205	.612
[group=1.00]	-2.816	.979	-2.877	.013	-4.930	-.701	.389
[group=2.00]	0 ^a

a. This parameter is set to zero because it is redundant.