

## Trend analysis for Independent Groups — Analysis of k-Between-Group Data with a Quantitative DV and a Quantitative IV

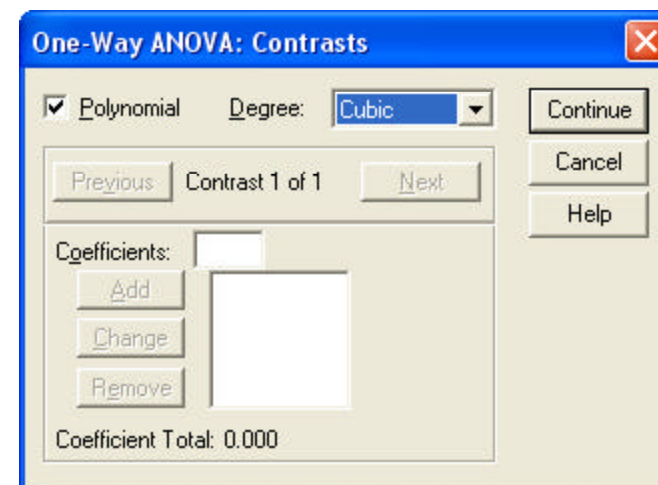
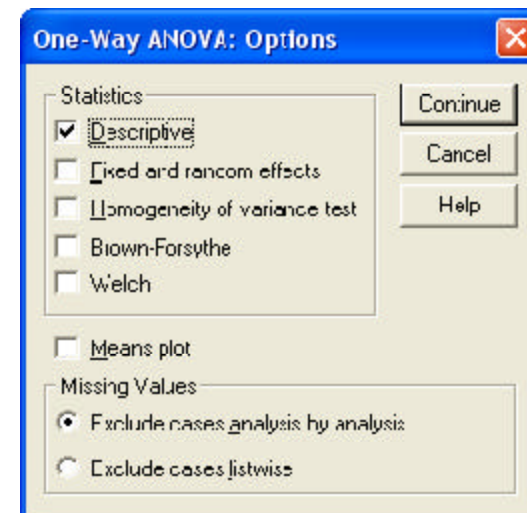
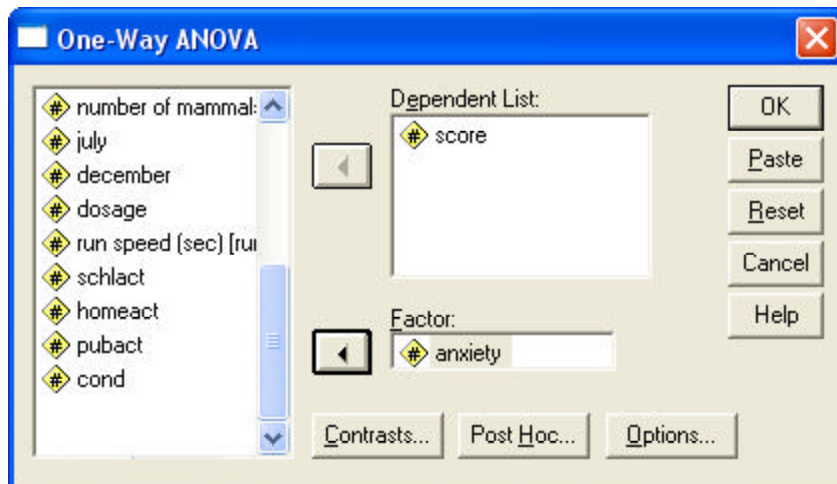
**Application:** To examine the “shape” of the IV-DV relationship (SPSS can only be used when IV conditions are equally spaced)

**Research Hypothesis:** Theory suggests an inverted U-shaped relationship between level of anxiety and performance.

**H0: for this analysis:** There is no mean differences among mean performance in the different anxiety conditions.

Analyze/ Statistics → Compare Means → One-way ANOVA

- highlight the “Dependent” variable (be sure it is **quantitative**) and click the arrow
- highlight the “Factor” (IV, grouping) variable (be sure it is **qualitative**) and click the arrow
- “Options” — check that you want “Descriptive Statistics”
- “Contrasts” — check that you want “Polynomial”
  - set “Degree” to “Cubic”



ANOVA

SCORE

		Sum of Squares	df	Mean Square	F	Sig.
Between Groups	(Combined)	41.867	5	8.373	10.048	.000
	Linear Terr Contrast	23.143	1	23.143	27.771	.000
	Deviation	18.724	4	4.681	5.617	.002
	Quadratic Contrast	14.860	1	14.860	17.831	.000
	Term Deviation	3.864	3	1.288	1.546	.228
	Cubic Terr Contrast	2.250	1	2.250	2.700	.113
	Deviation	1.614	2	.807	.969	.394
Within Groups		20.000	24	.833		
Total		61.867	29			

The omnibus-F results

Test of a linear trend -- yes there is a linear trend.

Test of whether there is a non-linear trend -- yep

Test of a quadratic trend -- yes

Test of whether there is a trend "more complex" than quadratic -- nope

Test of whether there is a cubic trend -- nope (but we knew that!)

Test of whether there is a trend "more complex" than cubic -- nope (but we knew that , too!)

Error df and MSe used for the omnibus and all trend tests

Reporting the Results

The average performance for each anxiety leve is summarized in Table 1. There were significant mean differences in the performances among the anxiety levels,  $F(5, 24) = 10.048$ ,  $Mse = .833$ ,  $p < .001$ . Trend analyses revealed that, as hypothesized, there was a quadratic component to the relationship,  $F(1,24) = 27.771$ ,  $p < .001$ , with the highest average performance for anxiety level 4. However, contrary to the research hypothesis, there was also a linear component to the relationship,  $F(1, 24) = 17.831$ ,  $p < .001$ , with higher average performance for the higher anxiety levels than for the lower anxiety levels.

Table 1.  
Summary of average performance for each anxiety level

Performance	Anxiety Level					
	1	2	3	4	5	6
Mean	.80	1.60	3.40	4.20	2.80	2.73
Standard deviation	.45	.55	1.14	.84	.84	1.46

The univariate stats for each condition:

Descriptives  
SCORE

	N	Mean	Std. Deviation
1.00	5	.8000	.4472
2.00	5	1.6000	.5477
3.00	5	3.4000	1.1402
5.00	5	4.2000	.8367
6.00	5	2.8000	.8367
Total	30	2.7333	1.4606