

### Quiz#3 Homework #14 Partial Answers

Here are data from a study of college student's confidence in finding a job following graduation. Each student was asked their major, which was categorized as 'social sciences,' 'physical sciences,' or 'business' (major). They also completed two questionnaires, told us whether or not they had ever previously had a job related to the one they were seeking after graduation (prireljob), and gave us the name of their academic advisor. We contacted their academic advisor and got from her or him a rating of confidence that the student would obtain a job in their field during the 12 months following graduation (adconf). The College Performance Index uses information about number of credits, types of courses, GPA, standardized test performance, research/creative activities, etc. to form a composite performance index (colperf). The Job Confidence scale measures students confidence they will obtain work in their chosen profession (jobconf) – the criterion variable for the analysis.

#### Data Preparation & Bivariate Analyses

##### 1. Prior related job experience

- a. Complete an ANOVA comparing the average jobconf scores of those students with and without related prior job experience.

Yes-prior job experience mean 66.542 std 13.598 No-prior job experience mean 63.695 std 16.042

- b. Complete a dummy-coded regression comparing the average jobconf scores of those students with and without related prior job experience.
- c. Complete a GLM/UNIANOVA analysis comparing the average jobconf scores of those students with and without related prior job experience.

Use the original prireljob variable – GLM will recode it so that the highest coded value (2=no) is the comparison group and the other (1=yes) is the target group.

Use EMMEANS to get the pairwise comparison of the two groups.

$R^2$  .009 F 1.225 df 1, 139 p .270

b 2.847 p .270 a 63.695 mean difference from EMMEANS 2.847 p .270

##### 2. Major

- a. Complete an ANOVA comparing the average jobconf scores of social science, physical science & business majors.

social sci mean 60.109 std 13.307 physical sci mean 67.170 std 16.408 business mean 67.229 std 14.540

- b. Complete a dummy-coded regression comparing the average jobconf scores of social science, physical science & business majors.

Use recode or if statements to dummy code the three-variable major variable into two dummy codes. Use "business" is the comparison group (coded 0) for both dummy codes. Social science should be the target group for the first dummy code and physical science should be the target group for the second dummy code.

$R^2$  .049 F 3.551 df 2, 138 p .031

social vs business b1 -7.120 p .021 physical vs business b1 -.059 p .985 a 67.229

- c. Complete a GLM/UNIANOVA analysis comparing the average jobconf scores of social science, physical science & business majors.

Use the original prireljob variable as a “BY” or “Fixed Factor” variable – GLM will recode it so that the highest coded value (3=business) is the comparison group for both dummy codes, 1=social science is the target group for the first dummy code and 2=physical science is the target group for the second dummy code.

Use EMMEANS to get the pairwise comparison of the three groups.

b1 -7.120 p .021 related mean difference from EMMEANS -7.120 p .021

b2 -.059 p .985 related mean difference from EMMEANS -.059 p .985

### 3. College Performance

a. Get the correlation between college performance and job confidence r .233 p .006

b. Complete a multiple regression looking at the linear and quadratic relationship between college performance and job confidence

get the mean 3.003 and std 1.189 for college performance

compute a mean-centered (linear) term for college performance & a quadratic term (square of the mean centered variable)

$R^2$  .088 F 6.672 df 2, 138 p .002

a 67.146

linear term b 2.906 p .006

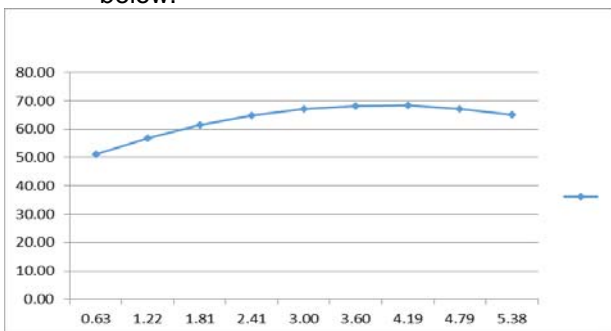
quadratic term b -1.610 p .025

Describe the regression results.

c. Complete a GLM/UNIANOVA analysis looking at the linear and quadratic relationship between college performance and job confidence

d. Verify that you got the same linear & nonlinear weights and NHST decisions from the regression and GLM analyses.

e. Use the “q nonlinear” tab on the “Plotting\_2way\_143” xls program to get the plot of this model. Copy the plot in below.



4. Advisors confidence rating

- a. Get the correlation between advisor's confidence and job confidence  $r = .055$   $p = .521$
- b. Complete a multiple regression looking at the linear and quadratic relationship between advisors confidence and job confidence

get the mean 60.234 and std 16.356 for advisors confidence

- c. Complete a GLM/UNIANOVA analysis looking at the linear and quadratic relationship between advisors confidence and job confidence

Use the linear and quadratic terms as "with" or "Covariate" variables (there will be no "BY" or "Fixed Effects" in this analysis).

$R^2 = .171$   $F = 14.217$   $df = 2, 138$   $p = .000$

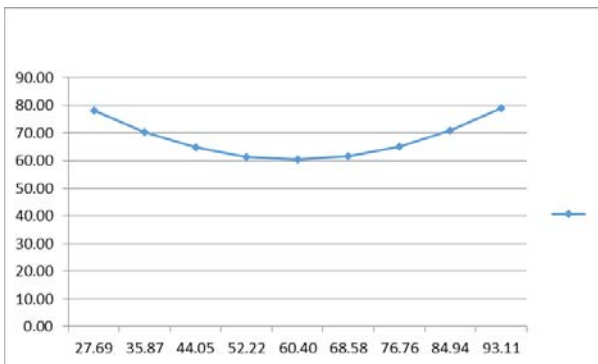
a 60.401

linear term  $b = .015$   $p = .835$

quadratic term  $b = .017$   $p = .000$

Describe the GLM results.

- d. Verify that you got the same linear & nonlinear weights and NHST decisions from the regression and GLM analyses.
- e. Use the "q nonlinear" tab on the "Plotting\_2way\_143" xls program to get the plot of this model. Copy the plot in below.



## Multivariate Analyses

### 5. Multiple regression

- a. Get the multivariate model using the dummy code for prior job experience, the two dummy codes for major, and the linear & nonlinear terms for both college performance and advisor's confidence rating.

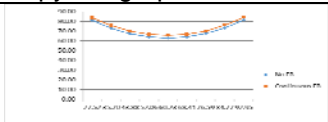
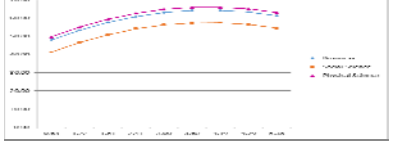
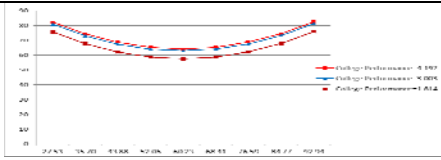
$R^2$  .315 F 8.740 df 7, 133 p .000

- b. Obtain and interpret each of the regression weights from the model. Be sure to give a "behavioral interpretation".

	b	p	Behavioral interpretation
Constant	62.946		(this is the mean for whom?)
Previous job	2.631	.236	(does previous job experience matter? Help or hurt? By how much?)
Social Sci vs Business	-6.758	.012	Are social sci majors dif from business majors? Higher or lower mean? By how much?)
Physical Sci vs. Business	1.781	.506	Are physical sci majors dif from business majors? Higher or lower mean? By how much?)
College perf linear	2.789	.003	Is there a linear contribution of college performance? Positive or negative? How much does confidence increase for a 1-unit increase in college perf?
College perf quadratic	-1.471	.022	Is there a quadratic contribution of college performance? U-shaped or inverted-U-shaped?
Advisor conf linear	.005	.944	Is there a linear contribution of advisor's confidence? Positive or negative? How much does confidence increase for a 1-unit increase in advisor's confidence?
Advisor conf quadratic	.017	.000	Is there a quadratic contribution of advisor's confidence? U-shaped or inverted-U-shaped?

- c. Each of the following plots using the "Plotting\_2way\_143" xls program. Gor all all of these plots:

- quantitative variables are "x" and "x2" variables in the plotting xls
- categorical variables are "z" variables in the plotting xls
- set all interaction terms to "0" (they will all look like product terms, e.g., xz, xz1, xz2, x1x2)

Plot to get	Copy the graph here
Use the "2xQ nonlinear" tab to plot prior job experience & advisor's confidence	
Use the "3xQ nonlinear" tab to plot major and college performance	
Use the "QxQ nonlinear" tab to plot advisor's confidence (as "x1") and college performance (as "x2")	

6. GLM/UNIANOVA

- a. Get the multivariate model using the original coded variables for prior job experience & major (both as “BY” or “Fixed Effect” variables – you should review how SPSS will dummy code these for the analysis) , and the linear & nonlinear terms for both college performance and advisor’s confidence rating as “with” or “Covariate” variables

Be sure to follow the example of the “/DESIGN” subcommand in the handout, so that you include just the main effects of prior job experience and major (and don’t include their interaction).

Use EMMEANS to get the pairwise comparisons of the two prior job experience groups and of the three major groups.

- b. Obtain and verify each of the regression weights from the model.

	b	p	Verify that you got the same weights as from the multiple regression analysis in “5”
Constant			
Previous job			
Social Sci vs Business			
Physical Sci vs. Business			
College perf linear			
College perf quadratic			
Advisor conf linear			
Advisor conf quadratic			

EMMEANS results:

Prior Job Experience

Corrected prior job exp mean 66.369 Corrected no prior job exp mean 63.738 mean difference 2.631 p .236

Major

Corrected Social Science mean 59.954 Corrected Business mean 66.712 mean difference -6.758 p .012

Corrected Physical Science mean 68.493 Corrected Business mean 66.712 mean difference 1.781 p .506