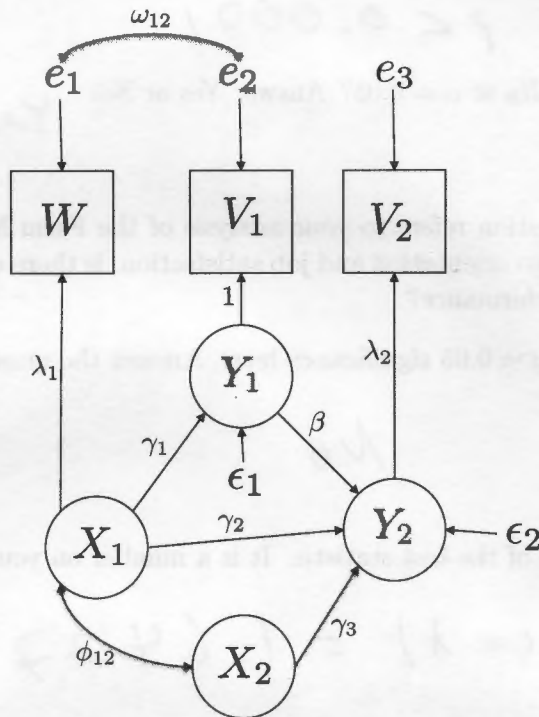


STA 431S 2017 Quiz 9

1. Consider the following path diagram.



(a) (2 points) Give the *latent* model equations in scalar form. ^{centered}

$$Y_1 = \gamma_1 X_1 + \epsilon_1$$

$$Y_2 = \gamma_2 X_1 + \gamma_3 X_2 + \beta Y_1 + \epsilon_2$$

(b) (3 points) Give the measurement model equations in matrix form; see the formula sheet. ^{centered}
Use symbols from the path diagram.

$$D = \begin{pmatrix} W \\ V_1 \\ V_2 \end{pmatrix} = \begin{pmatrix} \lambda_1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & \lambda_2 \end{pmatrix} \begin{pmatrix} X_1 \\ X_2 \\ Y_1 \\ Y_2 \end{pmatrix} + \begin{pmatrix} e_1 \\ e_2 \\ e_3 \end{pmatrix}$$

2. (2 points) In your analysis of the Farm Manager data, you did a Wald chi-squared test of all the regression coefficients at once.

(a) Give the value of the test statistic. It is a number on your printout.

63.27343

(b) Give the degrees of freedom. It is a number on your printout.

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(c) Give the p -value of the test. It is a number (or range of numbers) on your printout.

$p < 0.0001$

(d) Do you reject H_0 at $\alpha = 0.05$? Answer Yes or No. Yes

3. (3 points) This question refers to your analysis of the Farm Manager data. Controlling for knowledge, profit-loss orientation and job satisfaction, is there evidence that formal education is related to job performance?

(a) Based on the $\alpha = 0.05$ significance level, Answer the question Yes or No.

No

(b) Give the value of the test statistic. It is a number on your printout.

$Z_{\text{coef}} = 1.6427$

(c) Give the maximum likelihood estimate of the regression coefficient relating true formal education to true job performance. It is a number on your printout.

0.0726

(d) If you found evidence of a relationship between education and performance controlling for the other variables (and *only* if you did), briefly describe the connection in plain, non-statistical language.

No evidence of a relationship.

Please attach *both* your log file and your results file. Make sure your name appears on both documents. Attach the *log file*, not just a listing of the SAS program.