Answers Spring 2 exam 1997

Question 1

Calculate Wlin values for each subject, using -1 0 +1 values of delta for days 1, 2, and 3:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Wlin</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6.36</td>
</tr>
<tr>
<td>2</td>
<td>0.71</td>
</tr>
<tr>
<td>3</td>
<td>5.66</td>
</tr>
</tbody>
</table>

Test whether mean is different from zero:  
A: Wlin = 4.24 + e  
C: Wlin = 0 + e  

SSR = 53.93  
SSE (A) = 18.97  

Pre = SSR / (SSR + SSE) = 53.93 / (53.93 + 18.97) = .74  

F*(1,2) = 5.68  

There is not a significant difference between day 1 and day 3 performance.  
Given large effect size, recommend increasing n.

Question 2

A. F* (2, 49) = 7.55; Pre = .33.  So there are group differences in fertility.  Based on the contrasts used, one can conclude that the mean fertility of the UN group differs from the means of the other two groups.  Additionally, there is a significant difference between the mean fertility for the UM and RM groups.

B. F* (1, 50) = 23.89; Pre = .32.  Yes, there is a significant relationship between educational level and fertility, such that as educational level goes up by 1, predicted fertility goes down by .25 units.

C. F* (1, 48) = 24.60; Pre = .34.  Yes, there is a significant relationship between educational level and fertility when controlling for group.  Within groups, on average, as educational level goes up by 1, predicted fertility declines by .23 units.

D.  
A: Fert = b0 + b1X1 + b2X2 + b3Educ + e  
C: Fert = b0 + b1Educ + e  

<table>
<thead>
<tr>
<th>SSE(A)</th>
<th>SSE(C)</th>
<th>F*(2,48)</th>
<th>Pre</th>
</tr>
</thead>
<tbody>
<tr>
<td>86.77</td>
<td>115.39</td>
<td>7.92</td>
<td>.25</td>
</tr>
</tbody>
</table>

Controlling for education, both group contrast codes used in the analysis are significant.  So the UN group differs in fertility from the other two groups controlling for Education and the UM and RM groups differ in fertility controlling for Education.
E. \[ \begin{align*}
\text{RM} & \quad 6.00 - (-.23)(4.80 - 5.53) = 5.83 \\
\text{UM} & \quad 4.29 - (-.23)(6.06 - 5.53) = 4.41 \\
\text{UN} & \quad 4.13 - (-.23)(5.73 - 5.53) = 4.17
\end{align*} \]

F. \( F^*(1, 46) = 5.49; \) Pre = .11. Yes the two simple Educ slopes for the UM and RM groups are significantly different from each other. The difference is their two different simple slopes is \( 2 \times .128 \).

G. \(-.25\) As Educ goes up by one unit, predicted Fert goes down by .25 units, controlling for group and the group by education interaction.

\(-1.39\) The predicted UM RM difference when education equals zero.

\(.13\) Half the difference in the simple slope for Educ when we move from the RM to the UM group.