

STAT 516 - Spring 2003 - Homework 7

Due: Wednesday, April 30th

1) This problem concerns the ability of pre-school students to associate objects with words. The experiment randomly assigned 24 pre-schoolers to be exposed to the objects by either TV, Audio Tape, or Picture Books. The time they were exposed to the material was either 5 min, 10 min, 15 min, or 20 min. Unfortunately, some of the children became distracted over the longer time spans and were unable to complete the experiment. The response variable is a score based on how many of the objects they could identify, and how accurate their identifications were. It is desired to analyze this data as an ANCOVA with the time being a continuous variable.

Medium Used	Time of Exposure			
	5 min	10 min	15 min	20 min
TV	49	50	43	53
	39	55	38	48
Audio	55	67	53	85
	41	58		
Written	66	85	69	85
	68	92	62	

- Verify that the slopes of the regression lines are parallel (using $\alpha=0.05$).
 - Write down the model equation you are using, and get estimates of the parameters in it. Identify these parameters so that a reader could understand what the equation was saying.
 - Check the assumptions.
 - In terms of your model equation and the statement of the problem, explain what hypotheses are being tested by the p-values in the Type I and Type III tests respectively. Assuming that the assumptions were true, say if you would accept or reject the null hypothesis in each case.
- 2) For this problem we are using the data in Problem 5 (pg. 548) that can be found in Table 11.26 (pg. 551). It is desired to analyze it as a logistic regression.
- Report the parameter estimates, and give the equation you would use to predict the probability of an abnormal EEG.
 - Use the Hosmer-Lemeshow Statistic to judge whether a logistic form seems appropriate for this data set. State your conclusion.
 - Assume that the logistic form is appropriate. Test whether there is a statistically significant relationship between the ventricle measurement and an abnormal EEG at an $\alpha=0.05$ level.
 - What is the predicted probability of an abnormal EEG for a ventricle of size 15, and why might you doubt this prediction?