Psychology 320L
Psychological Statistics Lab
Lab Assignments
Spring Semester 2007

Be sure to follow ALL of the rules for submitting your work as written and delineated in the course syllabus.

Assignment 1. (5 pts.) Show ALL work to obtain full credit.
Assignment 1 is due Wednesday, February 7, no later than 11:50 AM

An hour examination in general psychology produced the following scores:

83 83 88 81 84 62 93 50 63 77
90 68 73 80 97 94 91 38 82 72
88 83 78 93 69 78 91 87 91 91

a) Compute the mean and standard deviation for this set of scores using your hand calculator.
b) Use SPSS to compute the mean and standard deviation. Attach to your assignment the SPSS data Table input and the SPSS output. Mark CLEARLY the values for the Mean and standard deviation.
c) Pick 4 different scores and convert each of the chosen scores to a Z-score using the mean and standard deviation found in part (a).
d) Convert the raw score X = 83 to a deviation IQ (Stanford-Binet) scaled score
e) Find the centile rank for a score (X = 91)
f) Convert the raw score X = 78 to a CEEB scaled score

Assignment 2: (3 pts.) Due Wednesday, February 14th at 11:50 AM. SPSS is NOT needed for this assignment.

The scores on a nationally given mathematics test are normally distributed with a mean of 76 and a standard deviation 12.

a. What percentage of scores falls between 64 and 83?
b. What percentage of scores falls between 61 and 74?
c. What percentage of scores falls above 82?
d. If there are 780 scores, how many of those would fall below 70?

Assignment 3 (7 pts.). Show ALL work to obtain full credit.
Assignment 3 is due at 11:50 AM, Friday, February 23rd. SPSS is not needed for this assignment. All computations are done by hand with a calculator.

1. “Grading on a curve” is defined as a method for assigning grades using the normal distribution. A professor for a large social psychology class at a TNB University used this method. With 532 students taking the test, the mean score was 106 and the standard deviation was 12.3. If thirteen percent of the class receives “A’s”, what is the lowest raw score that receives an A? How many students will receive a grade of “A?”

2. Student N was told that she received a raw score with an equivalent percentile rank of 62. Assuming a normal distribution, what would be E’s raw score if the distribution of raw scores has a mean of 207 and a standard deviation of 27?

3. A statistics professor conducts a study to investigate the relationship between the performance of his students on exams and their anxiety. Ten students from his class are selected for the study. Just prior to the final exam, the students are given an anxiety questionnaire. The data are given below:

<table>
<thead>
<tr>
<th>Student</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam</td>
<td>92</td>
<td>57</td>
<td>61</td>
<td>89</td>
<td>90</td>
<td>55</td>
<td>70</td>
<td>50</td>
<td>76</td>
<td>76</td>
</tr>
<tr>
<td>Anxiety</td>
<td>28</td>
<td>41</td>
<td>35</td>
<td>39</td>
<td>31</td>
<td>42</td>
<td>50</td>
<td>46</td>
<td>37</td>
<td>37</td>
</tr>
</tbody>
</table>

(a) Find the Pearson product moment correlation.
(b) Find the least squares equation for predicting final exam scores using anxiety level.
(c) Compute the sum-of-squares residual.
(d) How much of the variance between anxiety and exam performance is shared or in common?
Assignment 4: (4 pts.) Due Date: TBA

The following two problems are to be completed using SPSS. Be sure to mark, circle clearly the answer on your SPSS Output. Any SPSS output submitted without a clear indication of the answers will NOT be counted. Include a printout of the data entry.


2. Exercise 6-11 page 62 of the textbook. a) Find the regression line that predicts the moral judgment from poverty levels. b) Based on these data, what is the predicted moral judgment value if a person was at the 57 level of poverty? (This part of the problem is done through hand computations. The solution must be clearly marked.) c) Compute the standard error. d) Compute the coefficient of determination

Assignment 5: 6 pts. Due Date: TBA.

The computations for the following problems must be done by hand. You can use SPSS to check your computations. Do NOT include SPSS output with submission. Be sure to clearly layout the five steps of hypothesis testing. Show ALL work.

   a. Write the null and alternative hypotheses in statistical terms.
   b. Compute the value of the test statistic.
   c. State the decision rule using \( \alpha = .05 \) and the decision.
   d. What is your conclusion?

2. Social, developmental and educational psychologists were interested in studying the effect of social isolation during childhood on the intellectual development of children. Psychologists studying the issue believe that social interaction (an environmental component of intelligence) is necessary for normal intellectual development and thus predicted that the IQ score of children raised in social isolation would be lower than the population norm. They administered a standard IQ test with a population mean of 100 and a standard deviation of 15 to 20 children who were randomly selected from among a group of children who were determined to have been raised in conditions that conform to an operational definition of isolated. The data for the children were 85, 90, 95, 110, 85, 90, 95, 75, 120, 85, 100, 105, 85, 90, 95, 80, 90, 100, 95, and 85. Develop the appropriate hypothesis test using \( \alpha = .01 \).

3. Exercise 8-7 page 101 of textbook.
   a. State the null and alternative hypothesis in statistical terms.
   b. Compute the test statistic (use backside).
   c. State your decision rule using \( \alpha = .05 \) and decision.
   d. What is your conclusion?

Lab Assignment #6. (4 points) Due Date: TBA

Instructions: Perform the appropriate hypothesis test for each problem given below. However, for steps 3 and 4 of the hypothesis test using SPSS. Be sure to included SPSS output and CIRCLE the appropriate places used for steps 3 and 4. Also include the SPSS data table used in SPSS.

1. A researcher is interested in determining if an enriched environment increases the number of branches in dendrites in experimental rats. Previous research has shown rats with no enrichment have an average of 13.5 branches per dendrite. In the current research, 12 rats were given 30 minutes of an enriched environment (e.g. toys, exercise, etc.) each day for 60 days. At the end of 60 days one dendrite was extracted from each rat without harming the rat and the number of branches were counted. The results were 13, 17, 12, 15, 18, 10, 22, 18, 21, 19, 14, and 20. Conduct the appropriate hypothesis test to determine if an enriched environment increased the number of branches of dendrites. Use \( \alpha = .05 \). For steps 3 and 4 of the hypothesis test use SPSS.

   a. Use \( \alpha = .05 \). For steps 3 and 4 of the hypothesis test use SPSS.
   b. Identify and clearly state the independent and the dependent variables.

3. A counseling psychologist was interested in determining whether the perception of counselor’s expertise was affected by the approach the counselor utilized. In particular, the counseling psychologist was interested in contrasting a rational-emotive approach with client-centered approach using an instrument that asked participants to rate their perceptions of the counselor’s expertise in working with a client utilizing a number of questions on a 7-point Likert rating scale. Responses to each item were added together to form an expert score. A high score indicated a high level of perceived expertise. Twenty-two participants were randomly selected from a large pool and then randomly assigned to watch one of two video taped
counseling sessions. The client in the tapes presented the same problem for each counseling approach. Participants were asked to try to project themselves into the place of the client while viewing the tape. Upon completion of the tape, participants were asked to complete the counselor expertise rating scale. The researches predicted that there would be a difference in expertise ratings although it was not clear which approach would be better.

a. Conduct the appropriate hypothesis test using $\alpha = .05$ for the data given below. Note that one of the participants from the rational-emotive group dropped out. For steps 3 and 4 of the hypothesis test use SPSS.
b. Identify and clearly state the independent and the dependent variables.

Rational-Emotive: 51, 45, 43, 40, 48, 22, 61, 51, 64, 56, 34
Client-centered: 56, 42, 38, 41, 42, 25, 66, 38, 55, 61

a. Conduct the appropriate hypothesis test using $\alpha = .01$ using the data given below. For steps 3 and 4 of the hypothesis test use SPSS.
b. Identify and clearly state the independent and the dependent variables.

Assignment 7 (10 points)

Instructions: Perform the appropriate hypothesis test for each problem given below. Question 1 involves hand computations only. Show your work. Question 2 uses SPSS for computations only. Be sure to included SPSS output and CLEARLY CIRCLE the appropriate places used for steps 3 and 4. Also include the SPSS data table used in SPSS.

1. Problem 10-7, page 141.
a) Conduct the appropriate hypothesis test using the data given below at $\alpha = .05$. Hand computations only.
b) Ignoring the F-test, use the Scheffé method to test all possible pairwise comparisons. Use $\alpha = .05$
c) Ignoring the F-test, use the Tukey method to test all possible pairwise comparisons. Use $\alpha = .05$
d) What can you conclude as a result of these tests?

2. To determine if a relation between an inferred hemispheric style and problem-solving performance exists, participants were classified as having preferences of left, integrated, or right hemispheric style on the basis of scores on Your Style of Learning and Thinking. Participants were then asked to solve the seven disk Tower of Hanoi problem. The researcher recorded the number of moves it took to solve the problem. The data are provided below. Use SPSS for computations.

<table>
<thead>
<tr>
<th>Hemispheric Preference</th>
<th>Left</th>
<th>Integrated</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>238</td>
<td>194</td>
<td>176</td>
<td></td>
</tr>
<tr>
<td>206</td>
<td>207</td>
<td>185</td>
<td></td>
</tr>
<tr>
<td>224</td>
<td>213</td>
<td>210</td>
<td></td>
</tr>
<tr>
<td>225</td>
<td>226</td>
<td>189</td>
<td></td>
</tr>
<tr>
<td>229</td>
<td>208</td>
<td>211</td>
<td></td>
</tr>
<tr>
<td>195</td>
<td>195</td>
<td>186</td>
<td></td>
</tr>
<tr>
<td>213</td>
<td>191</td>
<td>196</td>
<td></td>
</tr>
<tr>
<td>219</td>
<td>203</td>
<td>205</td>
<td></td>
</tr>
<tr>
<td>248</td>
<td>209</td>
<td>210</td>
<td></td>
</tr>
</tbody>
</table>

a) Develop the appropriate hypothesis test to determine if difference hemispheric preference leads to different problem solving speed. Use $\alpha = .05$.
b) Ignoring the F-test, use the Scheffé method to test all possible pairwise comparisons. Use $\alpha = .05$
c) Ignoring the F-test, use the Tukey method to test all possible pairwise comparisons. Use $\alpha = .05$.
d) What can you conclude as a result of these tests?

Lab Assignment 8 (16 points)

Instructions: Perform the appropriate hypothesis test for each problem given below. Each question involves hand computations. (Show your work) and Question 1 also requires the use of SPSS. Be sure to included SPSS data table and output. CLEARLY CIRCLE the appropriate places that would be used in steps 3 and 4 of a hypothesis test.  

Fisher and Byrne* studied how men and women differed in their response to another person invading one's personal space. This study involved two variables, sex of participant (male and female) and spatial relationship between the subject and an invader. The dependent variable was the level of attraction the subject felt toward the invader. The level of attraction scores ranged from 2 (most negative) to 14 (most positive). This study was recently replicated in part. The data from this replication
are given below. Using two-way ANOVA with $\alpha = 0.05$, determine if there are sex and spatial relationship effects, on the dependent variable, level of attraction.

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th></th>
<th>Female</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Adjacent</td>
<td>One Seat Away</td>
<td>Across</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>9 8 11 10 10 9</td>
<td></td>
<td>9 8 11 10 10 9</td>
<td></td>
</tr>
<tr>
<td>One Seat Away</td>
<td>10 9 9 12 11</td>
<td></td>
<td>10 9 7 9 10</td>
<td></td>
</tr>
<tr>
<td>Across</td>
<td>14 12 10 11 10</td>
<td></td>
<td>13 8 10 9 11 12</td>
<td></td>
</tr>
</tbody>
</table>


a) Conduct the appropriate hypothesis test. Show all hand computations. (5 pts.)

b) Show SPSS data Table and output (1 pt.)

2. An educational administrator at a big school decided to study the relationship between productivity and rank of professors (Assistant, Associate and Full) For each faculty member sampled, it was rank was obtained from personnel files. The number of publications determined productivity. Conduct the appropriate hypothesis test to determine whether a difference exists between the ranks on productivity. Use $\alpha = 0.05$.

<table>
<thead>
<tr>
<th>Productivity</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant</td>
<td>58</td>
<td>39</td>
<td>12</td>
</tr>
<tr>
<td>Associate</td>
<td>20</td>
<td>25</td>
<td>36</td>
</tr>
<tr>
<td>Full</td>
<td>12</td>
<td>19</td>
<td>32</td>
</tr>
</tbody>
</table>

a) Conduct the appropriate hypothesis test using $\alpha = .05$. Show all hand computations. (5 pts.)

b) Compute Cramer’s V statistic. (1 pt.)

3. A market researcher hypothesized that consumers would choose item A 38% of the time, while items B and C are chosen 27% and 35%, respectively. To test this hypothesis, 200 consumers are recruited. Each consumer is asked to choose item A, B, or C. The results are:

<table>
<thead>
<tr>
<th>Choice</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>80</td>
</tr>
<tr>
<td>B</td>
<td>50</td>
</tr>
<tr>
<td>C</td>
<td>70</td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
</tr>
</tbody>
</table>

a) Conduct the appropriate hypothesis test to determine if these data fit the hypothesized distribution of choices. Use $\alpha = 0.05$. Show hand computations.

b) Show SPSS data table and output.