SW 430: Research Methods in Social Work I
Study Questions – 9
DUE: 10/23/07

§ Your name and the course number must appear on each page.
§ All pages must be stapled together.
§ Do not use the question sheet for your answers.
§ Your answers must be typed and single-spaced on an answer sheet.
§ You must separate answers for each question with a double space.
§ Your answers must be brief and responsive to the question.
§ Answers should be in your own words (accurate paraphrases). Do not use quotations.
§ Where the question calls for a list, each item on the list must be on its own line.
§ You must type tables on your answer sheet.
§ You must hand draw charts on an 8.5 x 11 inch sheet of graph paper.
§ Neatly display computations on an 8.5 x 11 inch sheet of ruled paper.
§ Use the arithmetic conventions outlined in
§ Format text and tables according to the guidelines in

Text: Stocks

1. Table 1 shows evaluation data for a six-week truancy reduction program carried out on a random sample of middle school students presenting with a truancy problem in the Clemens School District. The numbers represent the frequency of truant days in the six weeks prior to intervention (Y\text{Pre}) and the six weeks after intervention (Y\text{Post}).

<table>
<thead>
<tr>
<th>Y\text{Pre}</th>
<th>Y\text{Post}</th>
<th>Y_D = (Y\text{Post} - Y\text{Pre})</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>5</td>
<td>-2</td>
</tr>
<tr>
<td>10</td>
<td>7</td>
<td>-3</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>0</td>
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<tr>
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<td>-2</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>8</td>
<td>7</td>
<td>-1</td>
</tr>
<tr>
<td>8</td>
<td>6</td>
<td>-2</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>+1</td>
</tr>
</tbody>
</table>

ΣY_D = -9

Y_D = -0.9

s_{Y_D} = 1.28668…

For non-directional α_2 = .05, find the values for t_{obt} and t_{crit}. Round all answers to three decimal places, but do not use rounded answers in calculations. Please show your work.

2.01. s_{Y_D} = \frac{s_{Y_P}}{\sqrt{n}} = ________.

2.02. t_{obt} = ________.

2.03. df = ________.

2.04. t_{crit} = ________.

2.05. At a non-directional α_2 = .05, should you reject or fail to reject the Null Hypothesis? Why?

2.06. Suppose the truancy change scores were not normally distributed. What would be the appropriate non-parametric test?

2. Table 2 shows evaluation data for an eight-week brief therapy program for individuals with a problem with unrealistically low self-esteem. Study subjects counted the number of times they made negative self-evaluations in the first week of the program (Y\text{Pre}) and the last week of the program (Y\text{Post}). Y_D represents the change in number of negative self-evaluations between the first and last weeks of program participation (Y\text{Post} - Y\text{Pre}).
Table 2: Change in Negative Self-Evaluations

<table>
<thead>
<tr>
<th>ID</th>
<th>Y_{Pre}</th>
<th>Y_{Post}</th>
<th>Y_{D}</th>
<th>+R_{D}</th>
<th>–R_{D}</th>
</tr>
</thead>
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<td>–3</td>
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<tr>
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<td>16</td>
<td>–1</td>
<td>–13.5</td>
<td>–13.5</td>
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<td>17</td>
<td>16</td>
<td>–1</td>
<td>–13.5</td>
<td>–13.5</td>
</tr>
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<td>13</td>
<td>14</td>
<td>1</td>
<td>19.5</td>
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<td>–4.5</td>
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<td>–2.0</td>
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<td>–11.5</td>
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<td>17</td>
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<td>17</td>
<td>0</td>
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<td>14</td>
<td>15</td>
<td>1</td>
<td>19.5</td>
<td>19.5</td>
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<tr>
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<td>8</td>
<td>–3</td>
<td>–8.0</td>
<td>–8.0</td>
</tr>
</tbody>
</table>

Σ\[|R_D|\] = 39.0 105.0

For non-directional \( \alpha = .05 \), give the values for the Wilcoxon \( T_{obt} \) and \( T_{crit} \) to one decimal place. Please show your work.

2.01. \( T_{obt} \) = ________.
2.02. \( n_C \) = ________.
2.03. \( T_{crit} \) = ________.
2.04. At a non-directional \( \alpha = .05 \), should you reject or fail to reject the Null Hypothesis? Why?

3. Table 3 shows evaluation data for a prompting device used to help sixth-grade students with attention deficit disorder complete a complex academic task. Program evaluation staff randomly selected \( n = 50 \) sixth-grade students with a diagnosis of attention deficit disorder to participate in the study.

Each of these students had previously participated in a study skills program where they learned how to break down complex tasks into smaller components and work on the components one at a time until the task was completed.

All these students were enrolled in literature and composition classes where each had to write a 300-word essay on a specific chapter from the assigned reading each week. They wrote these essays during resource class.

The evaluators asked the resource teachers to report whether or not the students had finished their essays in the 50-minute resource class. They conducted this pre-test in the week before teaching students how to use the prompting device. At pre-test, 20 of the 50 students completed their essays in the allotted time.

Over the next week, the resource teachers met individually with each student and gave them additional instruction on how to estimate how much time they could spend on each part of the essay so as to finish on time. After this, they gave each student a small programmable timer that would flash a yellow “warning” light one minute before the student needed to move to the next part of the task and a green “go ahead” light at the time the student needed to start the next part.

The student practiced using the timers to prompt themselves for one week under the supervision of their resource teachers.
After this week of practice, the students used the timers while writing their weekly essay for the literature and composition class. At post-test, 33 of the 50 students completed their essays in the allotted time.

<table>
<thead>
<tr>
<th>Tables 3: Change in Task Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-Test</td>
</tr>
<tr>
<td>Pre-Test</td>
</tr>
<tr>
<td>Finished Task</td>
</tr>
<tr>
<td>Did Not Finish Task</td>
</tr>
<tr>
<td>Column Total</td>
</tr>
</tbody>
</table>

At $\alpha = .05$, give the values for the McNemar $\chi^2_{obt}$ and $\chi^2_{crit}$ to three decimal places. Please show your work.

\[
\chi^2_{obt} = \frac{(|f_A - f_D| - 1)^2}{f_A + f_D}
\]

3.01. $\chi^2_{obt}$ = ________.
3.02. $df$ = ________.
3.03. $\chi^2_{crit}$ = ________.
3.04. At $\alpha = .05$, should you reject or fail to reject the Null Hypothesis? Why or why not?

4. You want to see if counseling on how to use negotiation skills will influence the level of empathy in sixth graders judged to be at risk for engaging in aggressive behavior. You intend to pre-test the participants in this study on level of empathy before they participate in six weeks of counseling. Following completion, you will post-test each participant using the same empathy measure.

The dependent measure will be the score on an empathy questionnaire. Scores on this questionnaire are at the interval level and have a positively skewed and platykurtic distribution. You wish to use a statistical test to evaluate the difference between pre-test and post-test scores.

To identify the appropriate test, you must
- identify tests appropriate to the research design
- identify tests appropriate to the level at which the dependent (outcome) variable is being measured and, if relevant, to the distribution of dependent measure scores.

4.01. Appropriate Test = ___________________________

You want to be able to detect a medium effect size (as defined by Cohen).

Using non-directional $\alpha_2 = .05$ and a power level of $1-\beta = .80$, how large a sample should you pick?

4.02. Total Sample Size = __________

5. We randomly selected $n=12$ clients at our agency who had been unemployed (or working intermittently at “pick up” jobs) for a year. These clients formed a “job club” group that met on Thursdays at 7 P.M. at our agency. We administered the 25-item Clinical Anxiety Scale (CAS, Westhuis & Thyer) to each client before the “job club” group started.

The CAS is a 25-item questionnaire. We obtain a total CAS score by summing the 25 item scores. Higher scores indicate higher levels of anxiety.

The $n=12$ clients took the CAS again after 8 weeks of participation in the “job club group.”

The mean change score was $\overline{Y}_0 = -4.33$; the median change score was $Y_{.50} = -4$; and the mode change score was $Y_{Mode} = -4$. We have reason to believe that change scores for the CAS are normally distributed.
5.01. The independent variable in this study refers to which of the following.
- anxiety.
- (1) before participation, (2) 8 weeks of participation.
- CAS score.
- (1) employed, (2) unemployed.
- employment status.
- meeting time.
- program participation status.

5.02. Levels of the independent variable in this study refer to which of the following.
- anxiety.
- (1) before participation, (2) 8 weeks of participation.
- CAS score.
- (1) employed, (2) unemployed.
- employment status.
- meeting time.
- program participation status.

5.03. The dependent variable in this study refers to which of the following.
- anxiety.
- (1) before participation, (2) 8 weeks of participation.
- CAS score.
- (1) employed, (2) unemployed.
- employment status.
- meeting time.
- program participation status.

5.04. The dependent measure in this study refers to which of the following.
- anxiety.
- (1) before participation, (2) 8 weeks of participation.
- CAS score.
- (1) employed, (2) unemployed.
- employment status.
- meeting time.
- program participation status.

5.05. Identify the level of measurement (Nominal, Ordinal, Interval, or Ratio) for the dependent measure in this study.

5.06 What type of research design did this study use?
- single sample comparison
  [Uses a single sample. Evaluates difference between sample dependent measure values and known or theoretical population dependent measure values.]
- dependent samples comparison: pre-post
  [Uses a single sample. Evaluates change between pre-test and post-test dependent measure values for sampling units.]
- dependent samples comparison: matched-pairs
  [Uses two samples of matched sampling units (pairs). Evaluates difference between dependent measure values for the matched pairs of sampling units.]
5.07 Which, if any, statistical test(s) would be appropriate?

- dependent samples Student t test
- goodness-of-fit chi-square test
- McNemar change test
- single sample Kolmogorov-Smirnov test
- single sample Student t test
- Wilcoxon T (matched-pairs, signed ranks) test
- none of these tests is appropriate

5.08 Please explain your conclusion. Describe how this study meets or does not meet each of the two most important assumptions for statistical hypothesis testing. If you chose a specific test, describe how the study meets the additional assumptions for the specific test chosen.

Your discussion of the assumptions must support your conclusion about which, if any, test is appropriate. Your entire answer should be less than 200 words.