Text: Stocks Web Presentation on Single Subject Analysis; Bloom, Fischer & Orme

1. The chart in Figure 1.01 shows dependent measure data collected during a no-intervention baseline phase (Phase A) and during an intervention phase (Phase B).

Which of the following types of dependent measure change occurred between Phase A and Phase B? Select one answer from the following list.

- decrease in level of the dependent measure
- decrease in level followed by an increase in level of the dependent measure
- increase in level of the dependent measure
- increase in level followed by a decrease in level of the dependent measure
- no change in level of the dependent measure

2. The charts in Figures 2.01 through 2.04 each show dependent measure data collected during a no-intervention baseline phase (Phase A) and during an intervention phase (Phase B).

Which, if any, of the charts best supports a conclusion that the intervention condition was associated with higher dependent measure scores than the no intervention condition (that scores increased from Phase A to Phase B)?
Select one answer from the following list.

- Figure 2.01: Phase A = 26, 8, 5, 29, 5, 5, 6; Phase B = 23, 54, 21, 13, 29, 17, 41
- Figure 2.02: Phase A = 26, 8, 5, 29, 5, 5, 6; Phase B = 26, 37, 25, 21, 29, 23, 35
- Figure 2.03: Phase A = 17, 10, 9, 20, 9, 10, 9; Phase B = 23, 54, 21, 13, 29, 17, 41
- Figure 2.04: Phase A = 17, 10, 9, 20, 9, 10, 9; Phase B = 26, 37, 25, 21, 29, 23, 35
- There is not sufficient information to reach a decision.

Text: Stocks

3. Assuming that the premises are true, is the following deductive argument a valid argument? Why or why not?
   P1: “If someone is a registered voter, then he or she has a fixed address.”
   P2: “Jane has no fixed address.”
   Therefore
   C: “Jane is not a registered voter.”

4. Identify the level of measurement:
   Amount of Household Income in Dollars Above (Positive Value) or Below (Negative Value) Poverty Level.

5. Identify the level of measurement:
   Social worker rating of client status at case closure as
   −2=deteriorated; −1=slightly deteriorated; 0=no change; +1=slightly improved; +2=improved
6. We identified community leaders from the Chicano community and the Vietnamese community in our city. After identifying these leaders, we interviewed each of them about the social problems experienced by individuals in each of their communities. We want to evaluate the difference in type, extent and severity of social problems experienced by individuals in the two communities.

What type of samples (Chicano community leaders and Vietnamese community leaders) have we selected?
- cluster sample
- convenience sample
- purposive sample
- quota sample
- simple random sample
- snowball sample
- stratified sample
- systematic sample

7. The equation that defines the sum of squares for the variable \( Y \) is

\[
SS_y = \sum y^2 = \sum(y - \bar{Y})^2
\]

The following set of \( n = 7 \) scores has a mean of \( \bar{Y} = 3 \).
\{Y|Y = 8, 4, 1, 3, 4, 0, 1\}

7.01. Construct an APA-style table with three columns. Label the left column “Score (Y).” Label the center column “Deviation Score (y).” Label the right column “Squared Deviation Score (y^2).” Fill in the scores in the “Score” column, the deviation scores for each score in the “Deviation Score” column and the squared deviation scores for each score in the “Squared Deviation Score” column.

You must type the table on your answer sheet.

The table (without the numerical data filled in) should look like this.

<table>
<thead>
<tr>
<th>Score (Y)</th>
<th>Deviation Score (y)</th>
<th>Squared Deviation Score (y^2)</th>
</tr>
</thead>
</table>

7.02. Use the preceding formula to calculate the sum of squares for this set of scores. Please round your final answer for the sum of squares to no more than one decimal place.

\[
SS_Y = __________
\]

8. The chart in Figure 10.23 shows a linear relationship between the values of variable \( X \) and variable \( Y \).

We may define this line with a linear equation in the form \( Y = B_0 + B_1X \), where \( B_0 \) refers to the \( Y \)-intercept coefficient and \( B_1 \) refers to the slope coefficient.
Find the intercept and slope coefficients.

8.01. \( B_0 = \) _________

8.02. \( B_1 = \) _________

Insert these values into \( Y = B_0 + B_1X \) to write the linear equation that defines the data line in Figure 6.01.

8.03. \( Y = \) _____________.

9. We administer one instrument to each subject in a single group of subjects. We calculate the reliability coefficient based upon all inter-item correlations.

Retype this sentence with the blank filled in.

“This is a _____________ reliability coefficient.”

- Coefficient alpha
- Parallel administrations
- Parallel forms
- Split half
- Split plot
- Test-retest

10. The following table shows data on reported reliability coefficients of five tests designed to measure an individual’s level of anxiety.

<table>
<thead>
<tr>
<th>Test</th>
<th>Reliability Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Alpha</td>
</tr>
<tr>
<td>Anxiety Inventory</td>
<td>.90</td>
</tr>
<tr>
<td>Dysfunctional Fears Index</td>
<td>.90</td>
</tr>
<tr>
<td>Fear Assessment Scale</td>
<td>.93</td>
</tr>
<tr>
<td>Global Fear Scale</td>
<td>.92</td>
</tr>
<tr>
<td>Irrational Fears Scale</td>
<td>.86</td>
</tr>
</tbody>
</table>
The retest reliability coefficients for each test are based upon the correlations between test scores for two administrations of the test to the same group of individuals. The test administrations were separated by seven days.

The coefficient alpha reliability coefficients for each test are based on data collected from the first administration of the test. [Each test had the same alpha coefficient on the second administration.]

We want to select the test that would be most sensitive to change in anxiety level.

Based solely upon the reliability coefficient data in the table, which of the five tests would be most sensitive to change.

11. A randomly selected sample \(n = 18\) had a mean of \(\overline{Y} = 17\) with an estimated variance of \(s^2_Y = 36\). The estimated value of the standard error of the mean was \(s_Y = 1.41421 \ldots\)

We wish to evaluate the Null Hypothesis that the population from which our sample was taken had the same mean as a population with a mean of \(\mu = 20\).

We conducted a statistical hypothesis test at \(\alpha = .05\) that returned a calculated \(p = .049\).

11.01. What decision should we make about the Null Hypothesis?
- Reject the Null Hypothesis that \(\mu_Y = 20\).
- Do not reject the Null Hypothesis that \(\mu_Y = 20\).
- There is not sufficient evidence to make a decision about the population mean.

11.02. Explain why you decided to reject or not reject the Null Hypothesis. Discuss what the values for \(p\) and \(\alpha\) each stand for and how the relationship between the values for \(p\) and \(\alpha\) justifies your decision. Please limit your answer to no more than 125 words.

11.03. Is the difference between the sample mean of \(\overline{Y} = 17\) and the population mean of \(\mu_Y = 20\) statistically significant? Why or why not?

12. List and give non-circular definitions for each of these terms.
12.01. random selection:
12.02. random assignment:

13. We know that the national average for the Social Work Skills (SWS) test was \(\mu_Y = 83\).

We have administered the SWS test to a randomly selected group of \(n = 81\) social work students. The average score for this group was \(\overline{Y} = 86\) with a standard deviation of \(s_Y = 12.6\).

We calculate \(t_{\text{obt}}\) for a single sample Student \(t\) test as

\[
t_{\text{obt}} = \frac{\overline{Y} - \mu_Y}{s_Y}
\]

where
- \(\mu_Y\) refers to the population mean,
- \(\overline{Y}\) refers to the sample mean, and
- \(s_Y\) refers to the estimated standard error of the mean.

The standard error of the mean was

\[
s_Y = \frac{s_Y}{\sqrt{n}} = \frac{12.6}{\sqrt{81}} = \frac{12.6}{9} = 1.4
\]

We calculated \(t_{\text{obt}}\) as

\[
t_{\text{obt}} = \frac{\overline{Y} - \mu_Y}{s_Y} = \frac{86 - 83}{1.4} = \frac{3}{1.4} = 2.1428527 \ldots \approx 2.143
\]

For non-directional \(\alpha = .05\), give the values for \(t_{\text{obt}}\) and \(t_{\text{crit}}\) to three decimal places. Use the table of critical values for the Student \(t\) statistic in your text to find \(t_{\text{crit}}\) at a non-directional \(\alpha = .05\).
Please show all work on a separate sheet and type your answers on your answer sheet.

13.01. \(\text{df} = \underline{\text{__________}}\)

13.02. \(t_{\text{crit}} = \underline{\text{__________}}\)

13.03. Was the difference between sample and population means statistically significant at a non-directional \(\alpha = .05\) ? Why or why not?

14. We selected \(n = 36\) students from sixth and seventh grade students referred for truancy from the 18 middle schools in the Thatcher independent school district. We used a proportionate stratified random sampling procedure to select sixth and seventh graders in the same proportion as found in the state population of sixth and seventh graders. Table 13.39.a shows the numbers of unexcused absences for the 36 students in the sample for the six weeks before referral.

Table 13.39.b shows the statewide unexcused absence records for sixth and seventh graders referred for truancy over the six weeks prior to referral.

We wish to know whether sixth and seventh graders referred for truancy in the Thatcher independent school district show a statistically significant difference (\(\alpha = .05\)) in unexcused absent days from the statewide population of sixth graders referred for truancy.

### Table 13.39.a: Thatcher District (Grades 6 & 7)

<table>
<thead>
<tr>
<th>Unexcused Absent Days</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 – 36</td>
<td>2</td>
</tr>
<tr>
<td>17 – 24</td>
<td>9</td>
</tr>
<tr>
<td>13 – 16</td>
<td>11</td>
</tr>
<tr>
<td>9 – 12</td>
<td>7</td>
</tr>
<tr>
<td>7 – 8</td>
<td>4</td>
</tr>
<tr>
<td>5 – 6</td>
<td>3</td>
</tr>
<tr>
<td>0 – 4</td>
<td>0</td>
</tr>
</tbody>
</table>

### Table 13.39.b: Statewide (Grades 6 & 7)

<table>
<thead>
<tr>
<th>Unexcused Absent Days</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 – 36</td>
<td>3%</td>
</tr>
<tr>
<td>17 – 24</td>
<td>22%</td>
</tr>
<tr>
<td>13 – 16</td>
<td>23%</td>
</tr>
<tr>
<td>9 – 12</td>
<td>22%</td>
</tr>
<tr>
<td>7 – 8</td>
<td>13%</td>
</tr>
<tr>
<td>5 – 6</td>
<td>6%</td>
</tr>
<tr>
<td>0 – 4</td>
<td>1%</td>
</tr>
</tbody>
</table>

14.01. The independent variable in this study refers to which of the following.
- groups compared
- number of unexcused absent days
- referral status
- (1) referred, (2) not referred
- (1) sixth grade, (2) seventh grade
- (1) Thatcher district, (2) statewide
- truancy

14.02. Levels of the independent variable in this study refer to which of the following.
- groups compared
- number of unexcused absent days
- referral status
- (1) referred, (2) not referred
- (1) sixth grade, (2) seventh grade
- (1) Thatcher district, (2) statewide
- truancy
14.03. The dependent variable in this study refers to which of the following:
- groups compared
- number of unexcused absent days
- referral status
- (1) referred, (2) not referred
- (1) sixth grade, (2) seventh grade
- (1) Thatcher district, (2) statewide
- truancy

14.04. The dependent measure in this study refers to which of the following:
- groups compared
- number of unexcused absent days
- referral status
- (1) referred, (2) not referred
- (1) sixth grade, (2) seventh grade
- (1) Thatcher district, (2) statewide
- truancy

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

14.06. 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.]
- j = 2 dependent samples comparison:
  pre-post
  [Uses a single sample. Evaluates change between pre-test and post-test dependent measure values for sampling units.]
- j = 2 dependent samples comparison:
  matched pairs
  [Uses two samples of matched sampling units (pairs). Evaluates difference between dependent measure values for matched pairs of sampling units.]
- j = 2 independent samples comparison:
  [Uses samples formed by assigning sampling units to two different levels of the independent variable or uses samples selected from two different populations. Evaluates difference between dependent measure values for the two samples.]
- two variable correlation:
  [Uses a single sample. Evaluates correlation between ordered pairs of dependent measure values (X,Y).]
- j > 2 independent samples comparison:
  [Uses samples formed by assigning sampling units to each of the j>2 levels of the independent variable or uses samples selected from each of the j>2 populations. Evaluates differences among dependent measure values for all samples.]
14.07. Please evaluate this research vignette using the assumptions for statistical hypothesis tests to determine which, if any, statistical hypothesis test would be appropriate to evaluate the data from this research. Begin by briefly discussing whether the design and data meet the two basic (and most important) assumptions for all statistical hypothesis tests. Fully discuss how the design meets or does not meet the criteria for each of these assumptions. Unequivocally state whether or not each of these assumptions are met. Based upon this brief discussion, unequivocally state whether or not any statistical hypothesis test would be appropriate.

If you decide that some test would be appropriate, evaluate how this study meets or does not meet the additional assumptions for a specific statistical test. Otherwise, go to the next question.

Identify the tests appropriate for the research design used in this study. Then identify which of these tests would be ruled out due to the scaling of the dependent measure. If appropriate, identify which of the remaining tests would be ruled out due to the type of distribution of the dependent measure scores.

Your discussion of the assumptions must support your conclusion about which, if any, test is appropriate. Your entire explanation should contain fewer than 200 words.

14.08. Which, if any, of these statistical test(s) would be appropriate?

- dependent samples Student t test
- independent samples Student t test
- One-way analysis of variance
- single sample Student t test
- Student t test for the Pearson correlation
- none of these tests is appropriate.