Review #1: List the four steps in hypothesis evaluation.

I

II

III

IV
Lectlet 10B Page 2

Review #1: List the four steps in hypothesis evaluation.
Answer:

<table>
<thead>
<tr>
<th></th>
<th>Yours</th>
<th>Mine</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td></td>
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<tr>
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<td>III</td>
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<tr>
<td>IV</td>
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</tbody>
</table>

Review #2: List the three sketches we can use to illustrate the null hypothesis.

1. 
2. 
3. 

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**Answer:**

<table>
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</tr>
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<tbody>
<tr>
<td>1.</td>
<td></td>
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<tr>
<td>2.</td>
<td></td>
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<td>3.</td>
<td></td>
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</tbody>
</table>

New material begins...

Suppose we are interested...

**Outline of hypothesis evaluation**

I. State null and alternative hypotheses
   - Three illustrations of null hypothesis:
     1. Variable
     2. Sample statistic
     3. Test statistic

II. Set the criterion for rejecting $H_0$
   - A. Level of significance?
   - B. Directional or nondirectional?
   - C. Two illustrations of criterion
     1. ...on sample statistic
     2. ...on test statistic

III. Collect a sample and compute the observed values of the sample statistic and the test statistic

IV. Interpret the results

---

**Level of significance** = $\alpha = .05$ unless otherwise specified.

Nondirectional because problem asks whether Absotox affects ability.

Therefore $z_{cv} = \pm 1.96$

Therefore $\bar{X}_n = \mu + z_{cv} \cdot \sigma_x = 90 \pm 1.96 \cdot 4.00 = 82.16$ and $97.84$. 

---

**Sample Statistic** (by HAT score) 

<table>
<thead>
<tr>
<th>Mean HAT Score (secs)</th>
<th>[Samples of size 25]</th>
</tr>
</thead>
<tbody>
<tr>
<td>82</td>
<td>66</td>
</tr>
<tr>
<td>90</td>
<td>94</td>
</tr>
<tr>
<td>96</td>
<td>88</td>
</tr>
</tbody>
</table>

**Test Statistic** (by $z$) 

<table>
<thead>
<tr>
<th>$z_{cv} = -1.96$</th>
<th>$z_{cv} = 1.96$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rejection region</td>
<td>Rejection region</td>
</tr>
</tbody>
</table>
Suppose we are interested …

Outline of hypothesis evaluation

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\[ n = 25 \]


So $\sum X = 2428$

Then $\bar{X}_{obs} = \frac{\sum X}{n} = \frac{2428}{25} = 97.12 \text{ sec}$

\[ \bar{X}_{cv} = 82.16 \text{ sec} \quad \bar{X}_{cv} = 97.84 \text{ sec} \quad \bar{X}_{obs} = 97.12 \]

\[ z_{cv} = -1.96 \quad z_{cv} = 1.96 \quad z_{obs} = 1.78 \]

\[ z = \frac{\bar{X} - \mu}{\sigma_{\bar{X}}} \]

So $z_{obs} = (\bar{X}_{obs} - \mu) / \sigma_{\bar{X}} = (97.12 - 90) / 4.00 = 1.78$
Suppose we are interested in the effect of "Absotox" on cognitive ability. Our plan: to select 25 participants, administer Absotox, and then have them take the Hurlburt Anagrams Test ("HAT"). The score on the HAT is the number of seconds required to solve a series of anagrams. We have used the HAT in many previous studies, and know that in undrugged subjects, HAT scores are normally distributed with mean 90 seconds and standard deviation 20 seconds. Does Absotox affect cognitive ability?

Outline of hypothesis evaluation
I. State null and alternative hypotheses
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      1. ...on sample statistic
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III. Collect a sample and compute the observed values of the sample statistic and the test statistic
IV. Interpret the results
   A. Statistically significant?
   B. If so, practically significant?
      1. Effect size
      2. Illustrate
      3. Consider
   C. Describe (plain English)

"Because the observed value of the sample mean did not exceed its critical value, or, equivalently, because the observed value of the test statistic did not exceed its critical value, we did not reject the null hypothesis. We cannot conclude that Absotox has any effect on cognitive functioning."

End of lectlet.