

A Context-dependent Item Set

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Instructions: Read the following research scenario and answer the questions that follow.

Madame Clousseau claims to be a psychic—that is, she claims to be able to predict future events with a level of accuracy better than chance. To examine her claim, Professor Jones brings her into his laboratory and tests her under carefully controlled conditions. He tosses a standard, fair coin 300 times and has Madame Clousseau predict what the outcome will be for each toss. He finds that she correctly predicts the outcome for 157 of the tosses. When he carries out the statistical test to analyze the results, Professor Jones lets alpha equal 0.05 and he uses a two-tailed test.

1. What statistical test should Professor Jones use to analyze the data?
 - A. the t -test for independent samples
 - B. the z -test for binomial probability*
 - C. the one-sample z -test
 - D. the one-sample t -test
2. What is the null hypothesis for the statistical test?
 - A. $\mu_0=150$
 - B. $\mu_0=157$
 - C. $\mu_1 - \mu_2=0$
 - D. $\pi=0.50^*$
3. Suppose that the null hypothesis is actually **true**. What is the probability that Professor Jones will make a Type I error?
 - A. 0.05*
 - B. 0.10
 - C. 0.90
 - D. 0.95
4. Suppose now that the null hypothesis is actually **false**. If Professor Jones tossed the coin 50 times rather than 300 times, what effect would this have on the power of the statistical test?
 - A. The power would increase.
 - B. The power would decrease.
 - C. The power would not be affected at all.
 - D. This question cannot be answered using the available information.
5. Suppose once again that the null hypothesis is actually **false**. If Professor Jones set alpha at 0.10 instead of at 0.05, what effect would this have on the power of the statistical test?
 - A. The power would increase.
 - B. The power would decrease.
 - C. The power would not be affected at all.
 - D. This question cannot be answered using the available information.

Tips for Using Context-dependent Item Sets

In a context-dependent item set, a number of MC items follow the presentation of novel introductory material, such as a reading, scenario, data set, chart, or map. The MC items can be answered correctly only by referring to the introductory information. When using context-dependent item sets, keep the following in mind.

- Prepare introductory material that is appropriate for the specific course in which it is to be used.
- Be certain that the introductory material is novel.
- Make the introductory material as brief and clear as possible.
- When creating multiple-choice items, follow the usual item-writing guidelines.
- Construct multiple-choice items that assess higher-order cognitive processes, not memory or fact-finding skill.
- Let the number of multiple-choice items be proportional to the length of the introductory material.
- To reuse an item set, retain the form of an earlier item set and insert new content. Then make whatever minimal changes are necessary to harmonize the individual multiple-choice items with the new introductory material.

Adapted from Linn, R. L. & Gronlund, N. E. (1995). *Measurement and assessment in teaching*, 7th e. Upper Saddle River, New Jersey: Prentice-Hall.