

CHPT. 8

18. On a standardized anagram task (anagrams are sets of scrambled letters that must be arranged to form words), people successfully complete an average of $\mu = 26$ anagrams with $\sigma = 4$. This distribution is normal. A researcher would like to demonstrate that the arousal from anxiety is distracting and will decrease task performance. A sample of $n = 14$ anxiety-ridden subjects is tested on the task. The average number of anagrams solved is $\bar{X} = 23.36$.

- a. Do the anxiety-ridden subjects show a decrease in task performance? Test with alpha set at .01 for one tail.
- b. If a two-tailed test with $\alpha = .01$ was used, what conclusion should be drawn?

25. Performance scores on a motor skills task form a normal distribution with $\mu = 20$ and $\sigma = 4$. A psychologist is using this task to determine the extent to which increased self-awareness affects performance. The prediction for this experiment is that increased self-awareness will reduce a subject's concentration and result in lower performance scores. A sample of $n = 16$ subjects is obtained, and each subject is tested on the motor skills task while seated in front of a large mirror. The purpose of the mirror is to make the subjects more self-aware. The average score for this sample is $\bar{X} = 15.5$. Use a one-tailed test with $\alpha = .05$ to test the psychologist's prediction.

11. Educational administrators have complained for years that American high school students have little knowledge of world geography. To evaluate this complaint, a history teacher prepared a 40-question, multiple-choice geography test. Each question had 4 choices for the answer, so the probability of guessing correctly is $p = 1/4$. Thus, chance performance would result in an average score of $\mu = 10$ out of 40. The test was administered to a random sample of $n = 36$ students, and the mean score for the sample was $\bar{X} = 13.5$ with $s^2 = 144$. On the basis of these data, can the teacher conclude that the students' scores are significantly different from what would be expected by chance? Use a two-tailed test with $\alpha = .05$.

12. A recent survey of college seniors evaluated how the students view the "real world" that they are about to enter. One question asked the seniors to evaluate the future job market on a 10-point scale from 1 (dismal) to 10 (excellent). The average score for the sample of $n = 100$ students was $\bar{X} = 7.3$ with $SS = 99$. Ten years ago, the same survey produced an average score of $\mu = 7.9$ for this question. Do the sample data indicate a significant change in the perceived job market during the past 10 years? Test at the .01 level of significance.

16. A researcher would like to examine the effects of humidity on eating behavior. It is known that laboratory rats normally eat an average of $\mu = 21$ grams of food each day. The researcher selects a random sample of $n = 100$ rats and places them in a controlled atmosphere room where the relative humidity is maintained at 90%. The daily food consumption for the sample averages $\bar{X} = 18.7$ with $SS = 2475$. On the basis of this sample, can the researcher conclude that humidity affects eating behavior? Test at the .05 level.

3. Several different factors influence the value obtained for a t statistic. For each of the following, describe how the value of t is affected. In each case, assume that all other factors are held constant.

- a. What happens to the value of t when the variability of the scores in the sample increases?
- b. What happens to the value of t when the number of scores in the sample is increased?
- c. What happens to the value of t when the difference between the sample mean and the hypothesized population mean increases?

21. One of the original tests of extrasensory perception (ESP) involves using Zener cards. Each card shows one of five different symbols (square, circle, star, wavy lines, cross). One person randomly picks a card and concentrates on the symbol it shows. A second person, in a different room, attempts to identify the symbol that was selected. Chance performance on this task (just guessing) should lead to correct identification of one out of five cards. A psychologist used the Zener cards to evaluate a sample of $n = 9$ subjects who claimed to have ESP. Each subject was tested on a series of 100 cards, and the number correct for each individual is as follows: 18, 23, 24, 22, 19, 28, 15, 26, 25.

Chance performance on a series of 100 cards would be $\mu = 20$ correct. Did this sample perform significantly better than chance? Use a one-tailed test at the .05 level of significance.

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