问题

Scores in the first and fourth (final) rounds for a sample of 20 golfers who competed in PGAtournaments are shown in the following table (Golfweek, February 14, 2009, and February 28, 2009). Suppose you would like to determine if the mean score for the first round of a PGA Tour event is significantly different than the mean score for the fourth and final round. Does the pressure of playing in the final round cause scores to go up? Or does the increased player concentration cause scores to come down?

Player	First Round	Final Round	Player	First Round	Final Round
Michael Letzig	70	72	Aron Price	72	72
Scott Verplank	71	72	Charles Howell	72	70
D. A. Points	70	75	Jason Dufner	70	73
Jerry Kelly	72	71	Mike Weir	70	77
Soren Hansen	70	69	Carl Pettersson	68	70
D. J. Trahan	67	67	Bo Van Pelt	68	65
Bubba Watson	71	67	Ernie Els	71	70
Reteif Goosen	68	75	Cameron Beckman	70	68
Jeff Klauk	67	73	Nick Watney	69	68
Kenny Perry	70	69	Tommy Armour III	67	71

a. Use α= .10 to test for a statistically significantly difference between the population means for first-and fourth-round scores. What is the p-value? What is your conclusion?
b. What is the point estimate of the difference between the two population means? For which round is the population mean score lower?
c. What is the margin of error for a 90% confidence interval estimate for the difference between the population means? Could this confidence interval have been used to test the hypothesis in part (a)? Explain.

解释 已验证

步骤1

a.

$$H_0 : \mu_d = 0$$

$$H_a : \mu_d \neq 0$$

$$\alpha = 0.05$$

Determine the difference in value of each pair.

70	72	-2
71	72	-1
70	75	-5
72	71	1
70	69	1
67	67	0
71	67	4
68	75	-7
67	73	-6
70	69	1
72	72	0
72	70	2
70	73	-3
70	77	-7
68	70	-2
68	65	3
71	70	1
70	68	2

步骤2

Determine the sample mean of the differences:

$$\overline{d} = \frac{-2 - 1 + ... + 1 - 4}{20} = -1.05$$

Determine the sample standard deviation of the differences:

$$s_d = \sqrt{\frac{(-3 + 1.05)^2 + ... + (1 + 1.05)^2}{20 - 1}} \approx 3.3162$$

Determine the value of the test statistic:

$$t = \frac{\overline{d}}{s_d/\sqrt{n}} = \frac{-1.05}{3.3162/\sqrt{20}} \approx -1.416$$

The P-value is the probability of obtaining the value of the test statistic, or a value more extreme. The P-value is the number (or interval) in the column title of Table 2 containing the t-value in the row $df = n - 1 = 20 - 1 = 19$:

$$0.10 = 2 \times 0.05 < P < 2 \times 0.10 = 0.20$$

If the P-value is less than the significance level, reject the null hypothesis.

$$P > 0.10 \Rightarrow \text{ Fail to reject } H_0$$

There is not sufficient evidence to support the claim that there is a significant difference.

步骤3

步骤3/4

b. The point estimate of the difference between the two population means is the sample mean of the differences:

$$\overline{d} = -1.05$$

We cannot say that the population mean is lower for either round, because there was not a significant difference by part (a).

c. Determine the $t_{\alpha/2}$ using table 2 with $df = n - 1 = 20 - 1 = 19$:

$$t_{0.05} = 1.729$$

The margin of error is then:

$$E = t_{\alpha/2} \cdot \frac{s_d}{\sqrt{n}} = 1.729 \cdot \frac{3.3162}{\sqrt{20}} \approx 1.2821$$

The confidence interval could have been used, because the test in part (a) was a two-sided test.

结果

步骤4/4

a. $0.10 < P < 0.20$. There is not sufficient evidence to support the claim that there is a significant difference.

b. -1.05, No significant difference

c. 1.2821, Yes

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