

The Elements of a Test of Hypotheses

The Soccer Example



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Suppose a new interpretation of the rules by soccer referees is expected to increase the number of yellow cards per game. The average number of yellow cards per game had been 4. A sample of 121 matches produced an average of 4.7 yellow cards per game, with a standard deviation of .064 cards. At the 5% significance level, has there been a change in infractions called?



8.1: The Elements of a Test of Hypotheses

$$H_0: \mu = 4$$

$$H_a: \mu \neq 4$$

Sample statistic: $\bar{x} = 4.7$

$$\alpha = .05$$

Assume the sampling distribution is normal.

Test statistic:

$$z^* = \frac{\bar{x} - \mu_0}{s_{\bar{x}}} = \frac{4.7 - 4}{.064} = 10.94$$

Conclusion: $z_{.05} = 1.96$. Since $z^* > z_{.05}$, reject H_0 .
(That is, there *do* seem to be more yellow cards.)