10.3 Making Sense of Statistical Significance

Some fields have pre-set standards for α.

The P-value describes the strength of evidence, whereas α is a decision making tool.

Large sample sizes often produce statistically significant results, even when the effect is small.

$$z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}}$$

A U.S. Bureau of Standards inspector weighs a SRS of 50 6 oz. yogurt cups. Yogurt cup weights probably follow a roughly Normal distribution. Checking label accuracy, the inspector tests

$H_o: \mu=6$ against

$H_a: \mu<6$

The manufacturer says $\sigma = 0.3$ oz. for the weights.

Is the result significant at the $\alpha=0.001$ level if the inspector found...

$\bar{x}$ = 5.9 oz.? $p = .009 > .001 = \alpha$

do not reject H_o

$\bar{x}$ = 5.8 oz.? $p = 1.3 \times 10^{-6} < .001 = \alpha$

reject H_o

A researcher writes a new ACT prep course. The researcher tried the new course with a SRS of subjects and found $\bar{x}$ =20.2. That year, nat'l scores were not far from Normal with μ=20 & σ =1.2. The researcher tested

H_o: μ=20 against

H_a: μ >20

Find the P-value if the researcher's sample was...

40 students.

.15 > .05 .10 .01 don't reject H_o $\mu = 20$

100 students.

.047 < .05 .10 reject H_o $\mu > 20$ .01 don't reject

400 students.

4.3×10^{-4} < α .01 .05 .10 .001 reject H_o $\mu > 20$