17 May ①

this time: comparing 2 samples

↓

next time:

read: AMS5 FPP ch. 27

Alternative notes from our student note-takers available on course web page

pitfalls of significance testing

big picture: p. 22 VI. A

② estimates + give-or-takes (interval estimation) are far more informative than p-values

hwk 5 pp. 96-98 due Thu 26 May (1 week + 2 days)

ex. flex time CS 12 p. 89

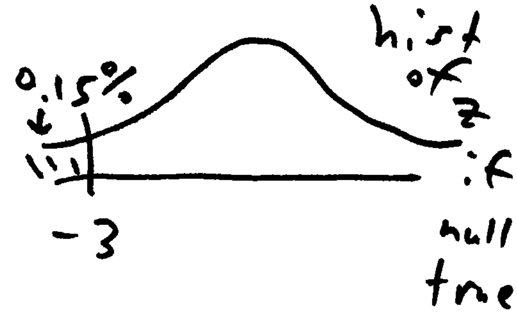
null: $\mu = 6.3$ days
alt: $\mu < 6.3$ days

$p = \underline{0.15\%}$ so highly stat sig, so

null certainly looks wrong, μ is less than 6.3, but by how much?

Q: Does p-value by itself tell us anything about practical significance?

$p = 0.15\%$ + $z = -3 = \dfrac{\text{signal}}{\text{noise}}$



signal = $\boxed{(\text{obs. } \bar{y})}$ − $(\underbrace{\text{exp. } \bar{y} \text{ if null true}}_{6.3})$ ②

A: no, because can't work out signal from $\frac{\text{signal}}{\text{noise}}$

by contrast: 95% CI for μ

estimate of μ: $\bar{y}$ = 5.4 days

give or take: $\hat{SE}(\bar{y})$ = 0.3 days

95% CI for μ: $\bar{y} \pm 2\,\hat{SE}(\bar{y}) = (5.4 \pm 2(0.3))$ days

$= (5.4 \pm 0.6)$ days

~~(——)~~ 6.3

4.8 5.4 6.0

95% CI for μ

"reject null" of 6.3 because it's not inside the 95% interval

pract. sig: 5.4 vs. 6.3 (a decline of 0.9 days per year per employee is large in real-world terms)

so intervals answer both questions: stat sig & pract. sig

whereas sig. tests only answer stat sig

VI. A comparing 2 samples

cs 14

treatment (supposedly causal) variable: T vs. C

discount strategy — standard strategy

AMS 5

Case Study 14 (business): Discount Pricing

Discount stores often introduce new merchandise at a special low price to induce people to try it. But in the mid-1960s a prominent psychologist predicted that in the long run this practice would actually *reduce* sales. With the cooperation of a discount chain (I think it was K-Mart), an experiment was performed in 1968 to test this theory. A representative sample of 120 stores was chosen, and the stores were arranged into 60 pairs, matched according to characteristics like sales volume and location. These stores did not advertise, and displayed their merchandise in similar ways. A new kind of cookie was introduced in all 120 stores. Within each pair of stores, one was chosen at random to introduce the cookies at the special low price of 49 cents a box, with the price increasing to 69 cents after two weeks; the other store in the pair introduced the cookies at the regular price of 69 cents a box. Total sales (in cases) of the cookies were computed for each store for six weeks from the time they were introduced; the results are given below. Does this evidence support or refute the psychologist's theory? Carry out the appropriate inferential procedure to answer this question. What was the point of pairing the stores in the way they did? Explain briefly.

pair number		discount sales	standard sales	difference (discount − standard)
1		851	916	−65
2		903	1004	−101
.		.	.	.
.		.	.	.
60		787	699	+88
	mean	854	923	−69
	SD	58	157	150

statsig

$\dfrac{854-923}{923}$

prastsig