Discussion section, week of 22–26 May 2017

Disc. Sec 6 #1

AMS 7 22 May 2017

p. R-62

(a) $\bar{y}_{old} = 28.1$ kg (1)

$\bar{y}_{new} = 26.0$ kg

$$\frac{\bar{y}_{new} - \bar{y}_{old}}{\bar{y}_{old}} = \frac{26.0 - 28.1}{28.1} = \frac{-2.1}{28.1} \approx -.075$$

mean wt. of sea otters in Elkhorn Slough declined by 7.5% in 5 years $\rightarrow$ 1.5%/yr

$\therefore$ (a) is (true)

1.5%/yr for 2 yr may not be practic'g, but added up over 5 yrs to become 7.5%, now it is practic'g.

inferential summary

(P)	unknown p°. summary of main interest	μ = p°. mean wt. of all 600 otters
(S)	estimate of μ	$\bar{y} = 26.0$ kg
↑	error for $\bar{y}$ as est. of μ	$\hat{SE}(\bar{y}) = \frac{s}{\sqrt{n}} \approx 0.6$ kg
(I)	95% CI for μ	$\bar{y} \pm 2.02\,\hat{SE} \approx 26.0\text{ kg} + (2)(0.6\text{ kg})$ $= 26.0\text{ kg} \pm 1.2\text{ kg}$
↓		

pop. (stat. inf.) sample imag. data

all sea otters at E. Sl. in 2nd part of the study (2013)

the observed sea otters

all possible $\bar{y}$'s

weight (kg.)

(actual) like SRS ≐ IID

$N \doteq 600$; $n = 42$; $n \to \infty$

26.0

mean $\bar{y} = 26.0$ kg

SD $s = 4.8$ kg

mean $\mu = ?$

SD $\sigma = ?$

pop. hist.

hyp. IID

sample hist

long run mean — EV of $\bar{y}$ $= \mu$

long run SD — $\hat{SE}$ of $\bar{y}$ $\doteq 0.6$ kg

$n = 42$

mean $\bar{y} = ?$

long run hist — $\hat{SE}$ 0.6 kg (*) CLT? — μ

EV of $\bar{y}$

$= E_{IID}(\bar{y}) = \mu$

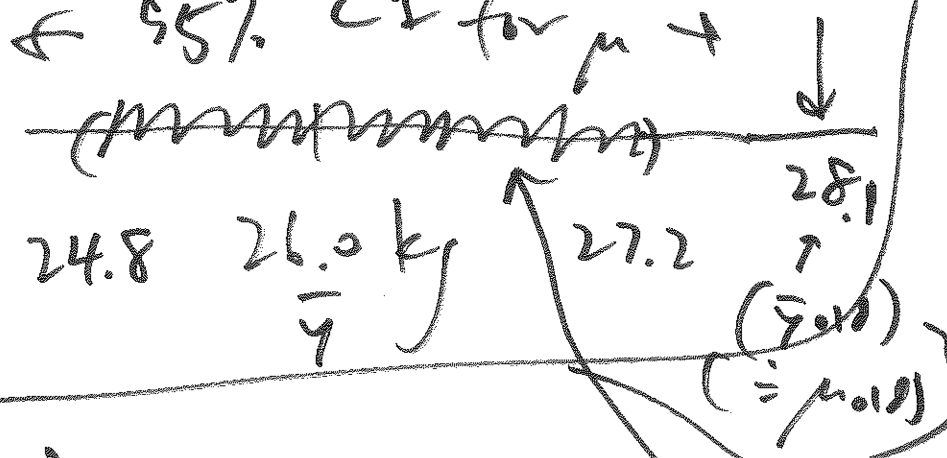
$\hat{SE}$ of $\bar{y}$ $=$ $\doteq 0.6$ kg

$$\hat{SE}_{IID}(\bar{y}) = \frac{s}{\sqrt{n}} = \frac{4.0 \text{ kg}}{\sqrt{42}} \doteq 0.62 \text{ kg}$$

(*) t_{41} long run hist of $\bar{y}$ accounting for uncertainty in σ

95%

$\leftarrow 2.02$



Since 28.1 is not in the 95% CI, the difference between 28.1 (old) & 26.0 (new) is statsig ↔ is not easy to attribute to unlucky sampling ↔ is probably real!

(d) true (look at interval)

(e) true by this reasoning

Note: A 95% CI for μ (mean wt. of all 600 otters) says nothing about any single otter

(c) false: to make it true, replace 0.6 by 4.0 = s

(0.6 = SE = uncertainty about $\bar{y}$ as est. of μ; s = uncertainty for 1 otter at a time)

(b) also false: replace 0.2 by σ ≐ 4.0 kg