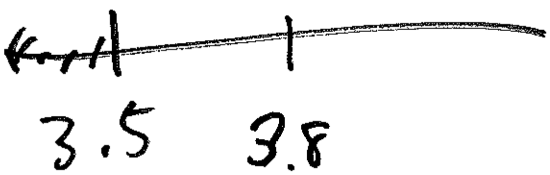
this time: statistical models for means & next time: proportions

read: DD (8) ch. 11, LN pp. L-137 → L-160

AMS 7 Nov 18 ①

today: LN pp. L-134 →

long-run hist of $\bar{y}$ $(n = 4)$



$P(\bar{y} < 3.5) = ?$

SE (standard error) of $\bar{y}$ =

SE of $\bar{y}$ = $\boxed{SE_{IID}(\bar{y}) = \frac{\sigma}{\sqrt{n}}}$ (*)

uncertainty in using $\bar{y}$ to estimate μ = noise level of $\bar{y}$

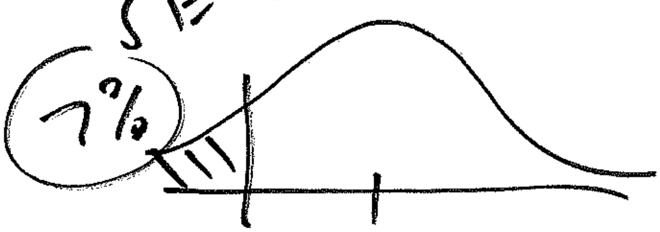
	in SE formula?
N	X
μ	X
σ	✓ $\sigma\uparrow$ $SE(\bar{y})\uparrow$
n	✓ $n\uparrow$ $SE(\bar{y})\downarrow$
M	X

$SE(\$)\uparrow$ with n

(*) = square root law: to cut SE($\bar{y}$) (our uncertainty about μ) in half, you have to quadruple n (mult. n by 4)

$$SE(\bar{y}) = \frac{\sigma}{\sqrt{n}} = \frac{0.2}{\sqrt{4}} = 0.1$$

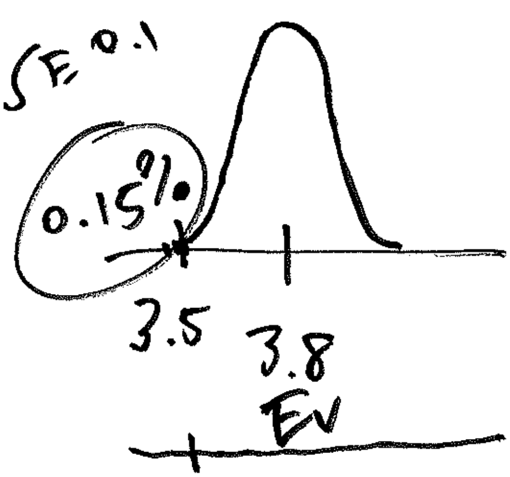
SE 0.2



hist of $\bar{y}$ ($n=1$)

CLT p. L-124

SE 0.1



hist of $\bar{y}$ ($n = 4$)

$$\frac{3.5 - 3.8}{0.1} = -3$$

n	p(misclassification)	cost
1	7%	\$25
4	0.15%	\$100

benefit

cost

downside of misclassification:
eat a few bananas that you didn't need to eat

12.27 | statistical inference ← 137

pop
whole
general

easier
probability
deduction
representative
= like at random
= like IID

sample
part
specific

harder
induction

(statistical) inference
← statistics

pop.
all crabs
similar to
sampled crabs
in all
relevant
ways

statistical
inf.
model

sample
the observed
crabs

imag. data

temp.

N = ?
(big)

like
SRS
= IID

temp. (4)

y_1 25.8

y_n 25.4

n = 25

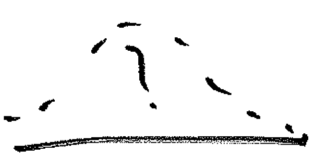
mean $\bar{y}$ = 25.0°C

SD s = 1.34°C

pop
mean μ = ?

pop
SD σ = ?

L-143
sample
hist



pop
hist.

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pop. represents broadest scope of valid generalizability outward from the sample

inferential summary

pop.	unknown pop. quantity of main interest	μ = pop. mean equil. temp.
sample	estimate of μ	$\bar{y} = 25.0°C$
imag. data		