Discussion Section 7

#1. paired comparison – repeated measures

each girl serves as a block, blocks are randomized. each block has 2 elements

i represents the individual (the girl) $\bar{Y}_B$ is the average of (1) & (2)

(a) practsig? No for 1 year of growth at a time, Yes for continual growth.

(b) Make an inferential model (this example is similar to the deer forelimb study)

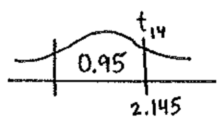
$\bar{d}$ is an est. of μd

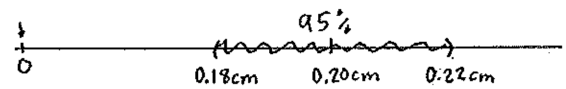
population: girls in North America of ages 5-6 in the 1950s

Build a 95% Confidence Interval:

$\bar{d} \pm (t_{n-1}^{0.95}) \frac{\cancel{\sigma_d}\ S_d}{\sqrt{n}}$

$0.2 \pm (2.145) \frac{0.0393}{\sqrt{15}}$





$0.2 \pm (2.145)(0.0101)$

0 is not even close to this interval

Highly, highly significant

fun fact: the secular trend in height refers to the generational increase in hight due to improved nutrition

< smaller than ≪ a <u>lot</u> smaller than

Discussion Section 8

#1. Completely randomized design, valid design to see if one drug is better than another on average

quantitative continuous $\bar{y}$ 2 samples, independent (sample sizes are different!)

(this example is similar to the daphnia study)

(a) sample 1 Ⓑ $n_1 = 6$ $S_1 = 0.58$ $\bar{Y}_1 = 8.75$ min

2 Ⓖ $n_2 = 7$ $S_2 = 0.82$ $\bar{Y}_2 = 9.74$ min

B ~11% faster

Practsig? Yes (but 8 mins is still a long time)

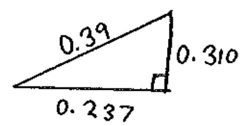
(b) Build the confidence interval

$(\mu_1 - \mu_2)$

$\bar{y}_1 - \bar{y}_2 = -0.99 \text{ min}$

$$\widehat{SE}(\bar{y}_1 - \bar{y}_2) = \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}} = \sqrt{\frac{(0.58)^2}{6} + \frac{(0.82)^2}{7}} = 0.39003$$

$= 0.39 \text{ mins}$



z number for bign

1.96

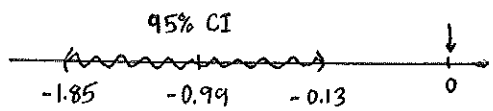
SE

$(\bar{y}_1 - \bar{y}_2) \pm (t_{n_1+n_2-2})(0.390)$

$t_{11} = 2.201$

$(2.201)(0.390) = 0.858$

$= (-0.99 \pm 0.86 \text{ mins})$



statsig ✓

#2 (quick talk-through)

100 out of 10,000 vs. 56 out of 10,000

practsig? yes worthy investment (an hour on a bike cuts risk in half)

dichotomous, 2 samples, independent

(This example is similar to the Redwood trees & SOD study)