HW Ch. 13.1 p. 791

(10) • μ_B = the true mean percent change in bone mineral in spines of breast feeding women for 3 months

μ_C = the true mean percent change in bone mineral in spines of non-breast feeding women for 3 months

• 2 sample t-test for means

• Conditions

	B	C
SRS	- no reason to assume otherwise	no reason to assume otherwise
Normalcy	$n \geq 30$ $47 \geq 30$ CLT - sample size large enough	$n = 22$ Boxplot — Symmetry, No outliers NPP ... Linearity Normal Approx Appropriate
Independence -	all breast feeding women $\geq 10(47)$	all non-breast feeding women $\geq 10(22)$

• Hypothesis:

H_0: there is no difference in mean bone mineral lost in breast feeding women and non-breast feeding women

H_a: breast feeding women lost more mean bone mineral than non-breast feeding women

$H_0: \mu_B = \mu_C$

$H_a: \mu_B < \mu_C$

- Calculations: $n_B = 47$ $n_C = 22$ $df = 66.2$

$\alpha = .05$ $\bar{x}_B = -3.59$ $\bar{x}_C = 0.31$

$s_B = 2.57$ $s_C = 1.30$

$$P\left(t < \frac{(-3.59 - 0.31) - 0}{\sqrt{\frac{(2.57)^2}{47} + \frac{(0.31)^2}{22}}}\right) = P(t < -8.51) = 1.66 \times 10^{-12}$$

Since our p-value of 1.66×10^{-12} is much smaller than our significance level $\alpha = .05$, we have evidence to reject the null hypothesis. We have evidence to conclude that the mean bone mineral lost for nursing women may be more than that lost for other women.

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(16) a) $t = \frac{70.37 - 68.45}{\sqrt{\frac{6.1809^2}{10} + \frac{9.0392^2}{8}}} = 0.5143$

b) $2P(t > .5143) = .6165 / 2 = .30825$ → because SAS software provides 2-sided!!

Since p-value .30825 > .05 we cannot reject H_0. There is no evidence to support a significant difference in mean weight for skilled and novice rowers.

(17) a) 2 sample t test
b) Paired t-test
c) Paired t test
d) 2 sample t test
e) Paired t-test

(18) a)

Group	Treatment	n	$\bar{x}$	s
1	IDX	10	116	17.71
2	Untreated	10	88.5	6.01

Control : 88.5 ± 1.9 days $1.9 = \frac{s}{\sqrt{10}} = 6.01$
IDX : 116 ± 5.6 days $5.6 = \frac{s}{\sqrt{10}}$ 17.71

b) df = 10 − 1 = 9

c) Assign digits 1 to 20 to hamsters; randomly select 10 digits 1 to 20 assigning IDX to these hamsters, remaining 10 hamsters are Control.

with calc : (2.3219, 7.0214) df = 14.97

(15) • Parameter μ_S = mean angular velocity of the knee for skilled races

μ_N = " " " " " " novice "

• Test : 2 sample t-test for means

• Condition : 1) SRS

2) Normality

3) Independence

• Hypothesis : $H_0 : \mu_S = \mu_N$

$H_a : \mu_S > \mu_N$ → conducting a one-sided test!

• Test statistic : $t = 3.1583$

↓ must divide p-value to get upper tail only!

• p-value : $2P(t > 3.1583) = .0104 / 2 = .0052$

a)

$.0052 < .01$ Evidence to reject H_0 and conclude ...

b) 90% conf int : $(4.1826 - 3.01) \pm 1.895\left(\sqrt{\frac{.1479^2}{10} + \frac{.3501^2}{8}}\right)$

$t^*_{.9}(7) = 1.895$ $\quad 1.1728 \pm 1.895(.3713)$

$1.1728 \pm .7037$

$(.4691, 1.8765)$

Calc

90% conf int

$t^*_{.9}(9.8)$ $\quad (.49814, 1.84775)$