Nov 14th Linear Combinations

Your Turn #1:

Find the linear combination for: Does the average of the means scores for the mobility disabilities equal the mean score for the hearing disability?

$\frac{1}{3}$ -1

$C_{wheelchair} = C_{crutches} = C_{computer} = \frac{1}{3}$

$C_{hearing} = -1$

$C_{none} = 0$

$\frac{1}{3}(\mu_{wheel} + \mu_{crutches} + \mu_{amp})$ — $\mu_{hearing}$

average for mobility — mean hearing

$\frac{1}{3}\mu_{wheel} + \frac{1}{3} \ldots$ $- \mu_{hearing}$

↑

4/6

Your Turn #2

Estimate & find SE for:

$$\mu_{hearing} - \tfrac{1}{3}(\mu_{amputee} + \mu_{crutches} + \mu_{wheelchair})$$

Estimate: plug in sample avgs for means

$$4.05 - \tfrac{1}{3}(4.43 + 5.92 + 5.34)$$

$$= -1.18$$

$$SE_g = s_p \sqrt{\frac{1^2}{14} + \frac{(-\frac{1}{3})^2}{14} + \frac{(-\frac{1}{3})^2}{14} + \frac{(-\frac{1}{3})^2}{14}}$$

$$= 0.50$$

Your turn #3

Test null hypothesis: $\mu_{hearing} = \frac{1}{3}(\mu_{amp} + \mu_{crutches} + \mu_{wheel})$

t-ratio $\dfrac{g - \gamma}{SE_g} = \dfrac{(-1.18 - 0)}{0.50} = -2.36$ t-statistic

in R $2*(1 - pt(2.36, 65)) = 0.02$

95% CI for $\mu_{hearing} - \frac{1}{3}(\mu_{amp} + \mu_{crutches} + \mu_{wheel})$

$$g \pm 2SE_g$$

$$-1.18 \pm 2(0.5)$$

$$(-2.18, -0.18) \quad 95\% \text{ CI}$$