V29 - Hypothesis Testing – Part 5

- Paired data (dependent populations)

- Use of T and Z distributions for inference on difference in two means from dependent populations

Course: Statistical Testing & Regression
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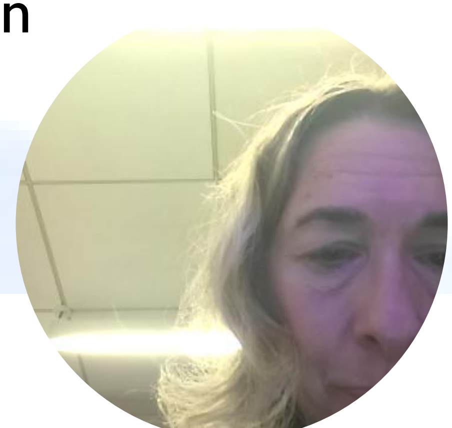

Paired (Dependent) Data Setups Occur When...

- Same subject - 2 different conditions
  - Before and after study (e.g., testing fitness program or teaching method)
  - Brand A vs. Brand B wear (Left & right foot of same person)
- "Matched" subjects (different persons)
  - Brother & sister pair
  - Husband & wife pair

- Reduces unwanted variability inherent with independent groups

Inference on difference in two means $\mu_1 - \mu_2$ (dependent populations or paired data)

σ^2_d unknown & small n

$H_0: \mu_1 - \mu_2 = \mu_D = 0 = d_0$

Test statistic: $T = \dfrac{\bar{d} - do}{s_d/\sqrt{n}}$

i	X1 (Before)	X2 (After)	d_i	
1	1	2	1	
2	3	5	2	
3	4	7	3	
4	5	9	4	
5	6	11	5	
6	7	13	6	
			3.5	AVG = ____
			1.9	STDEV =___

$\bar{d}$ is mean of sample differences d_i's

S_d is standard deviation of d_i's

n is number of ______

d_i's ~ ______

Inference on difference in two means $\mu_1 - \mu_2$ (dependent populations or paired data)

σ^2_d known

$H_0: \mu_1 - \mu_2 = \mu_D = 0 = d_0$

Test statistic: $Z = \dfrac{\bar{d} - do}{\sigma_d / \sqrt{n}}$

$\bar{d} \sim$

Inference on difference in two means $\mu_1 - \mu_2$ (dependent populations or paired data)

σ^2_d unknown & large *n*

$H_0: \mu_1 - \mu_2 = \mu_D = 0 = d_0$

Test statistic: $Z \sim \dfrac{\bar{d} - do}{s_d/\sqrt{n}}$

S_d good estimator of ______ since ______

$\bar{d} \sim$ ___by CLT (n ≥ ___)

Inference on difference in two means $\mu_1 - \mu_2$

Relationship to Confidence Interval

$H_0: \mu_1 = \mu_2$ $\quad\quad d_0 =$ __________

(,) _______________

(,) _______________

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