

STA 205 STATCRUNCH EXAMPLES FOR DEPENDENT, OR PAIRED, SAMPLES

TEST OF HYPOTHESIS FOR MEAN DIFFERENCE

The following experiment was conducted in Introduction to Biology classes at NKU.

As part of a human senses lab, an experiment is conducted to investigate how close two points can be felt on the skin. Each student is tested on two areas of the body, the finger and the calf. The smallest distance, measured in millimeters (mm), at which two points can be felt is recorded for each of these areas. The following data were obtained for a sample of 11 students.

Student	1	2	3	4	5	6	7	8	9	10	11
Finger	2	2.5	2	3	2	3	4	3	2	3	5
Calf	27	34	14	38	12	40	35	32	13	18	27

It is desired to see if there is sufficient evidence to conclude that the mean distance for the finger differs from the mean distance for the calf for the two areas. To obtain the calculations for the desired test, use

```
Stat ► T Statistics ► Paired
  Sample 1 in: Finger
  Sample 2 in: Calf
  Next ►  Hypothesis Test
           Null: Mean = 0
           Alternative: ≠
           Calculate
```

Hypothesis test results:

$\mu_1 - \mu_2$: mean of the paired difference between Finger and Calf

H_0 : $\mu_1 - \mu_2 = 0$

H_A : $\mu_1 - \mu_2 \neq 0$

Difference	Sample Diff.	Std. Err.	DF	T-Stat	P-value
Finger - Calf	-23.5	3.0338993	10	-7.745807	<0.0001

CONFIDENCE INTERVAL FOR MEAN DIFFERENCE

If it is desired to estimate the mean difference in the distances for the two areas using a 95% confidence interval, use

```
Stat ► T Statistics ► Paired
  Sample 1 in: Finger
  Sample 2 in: Calf
  Next ►  Confidence Interval
           Level: 0.95
           Calculate
```

95% confidence interval results:

$\mu_1 - \mu_2$: mean of the paired difference between Finger and Calf

Difference	Sample Diff.	Std. Err.	DF	L. Lim	U. Lim
Finger - Calf	-23.5	3.0338993	10	-30.259949	-16.740051