

Chapter 10 FRAPPY!

Sample #1

Directions: Show all your work. Indicate clearly the methods you use, because you will be scored on the correctness of your methods as well as on the accuracy and completeness of your results and explanations.

Will using name-brand microwave popcorn result in a greater percentage of popped kernels than using store-brand microwave popcorn? To find out, Briana and Maggie randomly selected 10 bags of name-brand microwave popcorn and 10 bags of store-brand microwave popcorn. The chosen bags were arranged in a random order. Then each bag was popped for 3.5 minutes, and the percentage of popped kernels was calculated. The results are displayed in the following table.

Name-brand	95	88	84	94	81	90	97	93	91	86
Store-brand	91	89	82	82	77	78	84	86	86	90


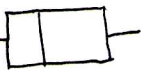
Do the data provide convincing evidence that using name-brand microwave popcorn will result in a greater mean percentage of popped kernels?

$$H_0: \mu_N = \mu_S \quad H_a: \mu_N > \mu_S$$

$\alpha = .05$ where μ_N is the true mean % of popped name-brand kernels and μ_S is the true mean % of popped store-brand kernels

Random? Two independent random samples ✓

10 %? 10 < 10 % of name brand bags of popcorn ✓
10 < 10 % of store brand bags of popcorn

Normal? N —  S —  Neither has outliers or strong skewness
OK to believe populations are approx Normal ✓

$$t = 2.43$$

$$df = 17.93$$

$$P = 0.013$$

Because $p\text{-value} = 0.013 < \alpha = 0.05$, I reject H_0 .
There is convincing evidence that the true mean % of popped kernels is higher for the name brand.
There is only a 0.013 probability of getting results like these.

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Sample #2

Directions: Show all your work. Indicate clearly the methods you use, because you will be scored on the correctness of your methods as well as on the accuracy and completeness of your results and explanations.

Will using name-brand microwave popcorn result in a greater percentage of popped kernels than using store-brand microwave popcorn? To find out, Briana and Maggie randomly selected 10 bags of name-brand microwave popcorn and 10 bags of store-brand microwave popcorn. The chosen bags were arranged in a random order. Then each bag was popped for 3.5 minutes, and the percentage of popped kernels was calculated. The results are displayed in the following table.

Name-brand	95	88	84	94	81	90	97	93	91	86
Store-brand	91	89	82	82	77	78	84	86	86	90

Do the data provide convincing evidence that using name-brand microwave popcorn will result in a greater mean percentage of popped kernels?

State: $H_0: \mu_N - \mu_S = 0$

$\mu_N = \text{name brand}$

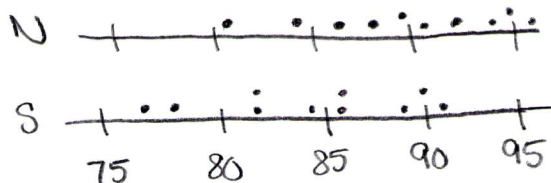
$H_a: \mu_N - \mu_S > 0$

$\mu_S = \text{store brand}$

Plan: 2 sample t test

Random? \checkmark given

Normal?



Both distributions are approximately Normal \checkmark

Do:

$$t = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}} = \frac{(89.9 - 84.5) - 0}{\sqrt{\frac{5.13^2}{10} + \frac{4.81^2}{10}}} = 2.43$$

$$df = 10 - 1 = 9$$

$$.01 < p\text{-value} < .02$$

Conclude: Reject H_0 . The mean percentage for name-brand is higher than the mean percentage for store brand.