Hypothesis Testing *Difference in means test*

Paired t-test

- Used to test claims around *difference* in two population means.
- Requires a sense of ‘pairing’ across individual observations in the two samples.

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Paired t-test (*Example*)

You are the training manager for a large organization. It is your job to ensure that training needs of employees are met. One such training need is that of computer skills. You regularly send out batches of employees to such computer skills training organized by a third party vendor. Since the training costs money you wish to evaluate whether the training is indeed effective in improving the computer skills of employees. You decide to give a standardized computer skills test to employees before they go for such training and you again administer similar test when they come back from training. You also set a bench mark that the training would be considered effective if on average the 'after scores' are at least 10 points greater than the 'before scores'.

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50 employees randomly selected from the training pool

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Claim to be tested…

The training was effective. That is, on average the 'after scores' are at least 10 points greater than the 'before scores'.

***Step 1* : Formulate Hypothesis**

H_0: $\mu_{after} - \mu_{before} \geq 10$

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***Step 2* : Calculate the t-statistic**

- **Use the data analysis toolbox of Excel.**
- **Two population means in the Null hypothesis**

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H_0: $\mu_{after} - \mu_{before} \geq 10$ Reject the Null hypothesis

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The training was effective. That is, on average the 'after scores' are at least 10 points greater than the 'before scores'

the training is not effective based on the benchmark

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Paired t-test, *some important considerations*

1. Sense of pairing across individual observations of the two samples.
2. The two samples should have equal number of observations.
3. You may have your conclusion reversed in using a paired t-test versus either the equal or unequal variances t-test.

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