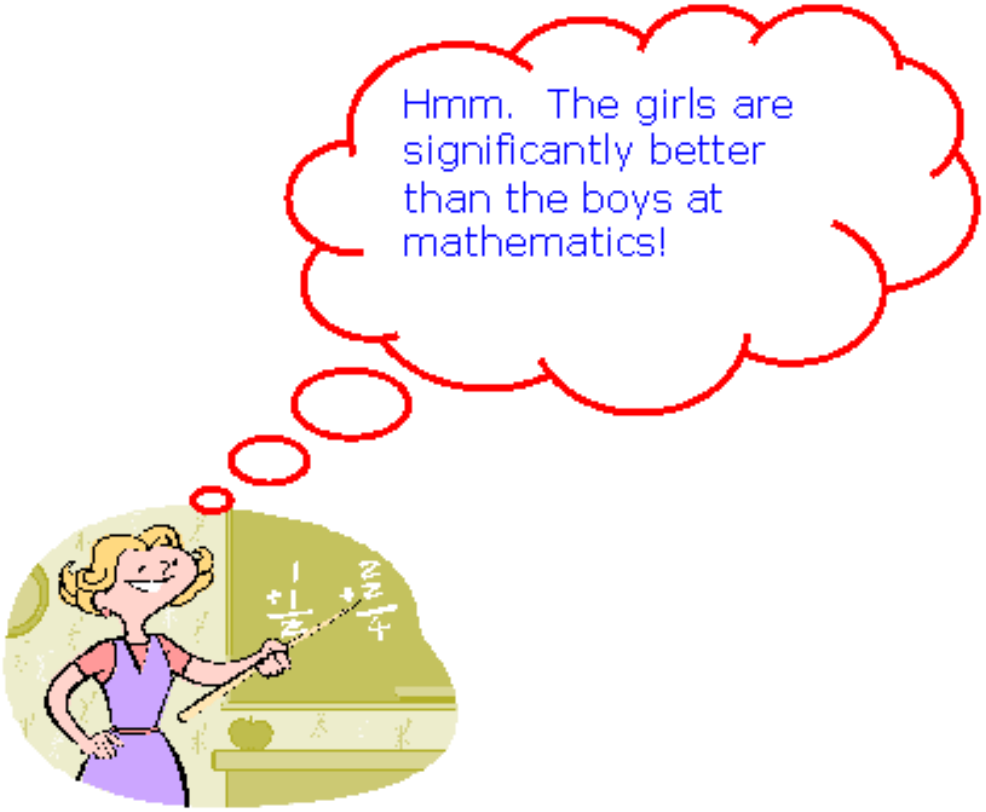
t-Test


Hmm. The girls are significantly better than the boys at mathematics!

t-test

- **Used to test whether there is significant difference between the means of two groups:**

Male v female

Full-time v part-time

Types

- **Independent-samples**

  Compare mean scores of 2 different groups

- **Paired-samples**

  Compare mean of the same group on 2 different occasions

- **Ex: weight before and after a given diet.**

- **More than that, use ANOVA**

Independent

- **It needs:**
  - **One categorical variable / independent variable**
  - **One continuous variable / dependant variable**

- **What the test will do:**
  - **It will tell you whether there is a statistically significant difference in the mean scores for the 2 groups.**

- **<u>Assumptions needed:</u>**
- **-normality**
- **-homoscedasticity**
- **-independence**

Paired

- **One group but 2 different occasion / conditions**
  - **E.g. pre/post test**
- **Requirements: the same as independent**
  - **One categorical independent**
  - **One continuous, dependent variable**
- **It will tell you whether there is a statistically significant in the mean scores**

T-test: SPSS Output

Independent Samples Test

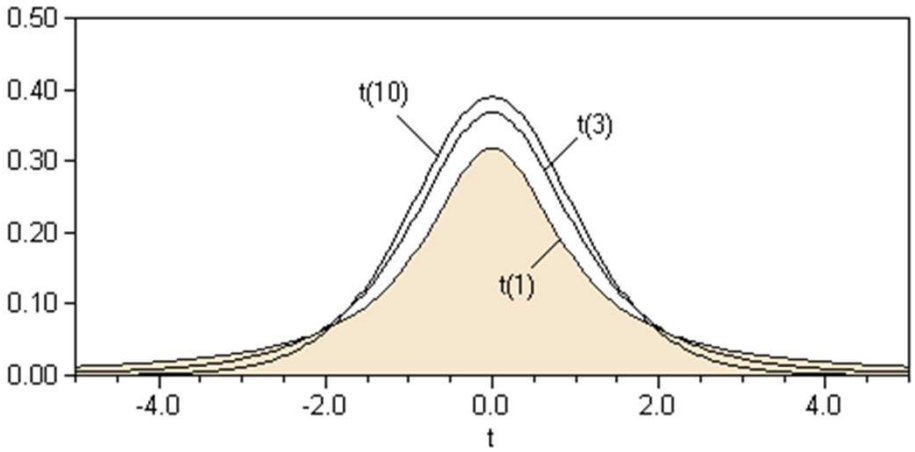
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
affcomm	Equal variances assumed	1.048	.306	2.116	670	.035	.117040	.055308	.008442	.225638
	Equal variances not assumed			2.123	666.213	.034	.117040	.055135	.008780	.225300
concomm	Equal variances assumed	5.353	.021	.665	670	.506	.036788	.055335	-.071863	.145440
	Equal variances not assumed			.670	669.997	.503	.036788	.054899	-.071006	.144582
norcomm	Equal variances assumed	.656	.418	-.679	670	.497	-.034500	.050813	-.134272	.065271
	Equal variances not assumed			-.680	668.726	.497	-.034500	.050723	-.134097	.065096

(1) Sig. is 0.306 (> 0.05) so there is no significant difference in the variances of the two groups
(2) so the row "**Equal variances assumed**" will be used to read the sig. of t-test
(3) Sig. level for t-test is 0.035 (<0.05)

Therefore there is a significant difference in the levels of affective commitment (affcomm) between male and female employees.

T - value

- **Used to work out if sample differences are significant.**



- **The higher the t-statistic value, the lower the probability.**
- **Which probability? The probability that the difference is random.**
- **i.e more probable that the difference observed is due to a systematic influence (i.e. experimental intervention).**
- **The actual distribution depends on the degrees of freedom**

***Generally, any t-value greater than +2 or less than - 2 is acceptable**

T-test: Interpretation

- **For the variable “affcomm”**

  Levene’s Test for Equality of Variances shows that F (1.048) is not significant (0.306)* therefore the “Equal variances assumed” row will be used for the t-test.

  *** This score (sig.) has to be 0.05 or less to be considered significant.**

T-test: Interpretation

- **Under the “t-test for Equality of Means” look at “Sig. (2-tailed)” for “Equal variances assumed”.**

- **The score is 0.035 (which is less than 0.05), therefore there is a significant difference between the means of the two groups.**

Reporting t - test in APA style

- **Report degrees of freedom in parentheses.**
- **Report the *t* statistic (rounded to two decimal places) and the significance level.**

- **There was a significant effect for gender, *t*(54) = 5.43, *p* < .05, with men receiving higher scores than women.**

Exercises

- **Is there difference in the number of men and women trying to study at UCBa?**

- **Using the dataset Guapore 2, test if there is difference between egg size of turtles from Guapore and turtles from Sao Paulo.**