Supplement H: report writing for independent samples *t* tests

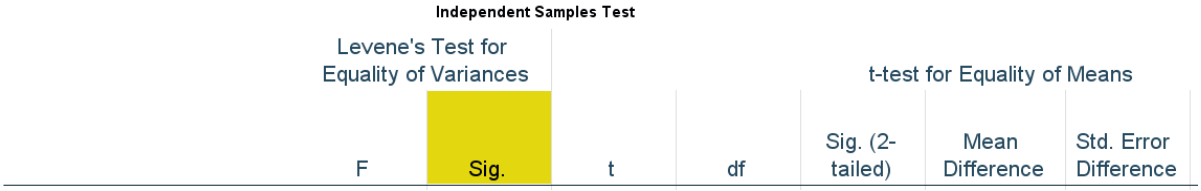
A report on an independent samples *t*-test should include:

- Introduction, including the alternative hypothesis for the study
- Sample description, including nature of the samples and mean, standard deviation and size of each sample
- Comparison of sample means
- Difference significant or not significant, quoting *t*, *df* and *p*
- 95% confidence interval interpretation, quoting relevant values
- Conclusion which relates back to alternative hypothesis

Checking the equal variances assumption

When looking at SPSS output for the independent samples *t*-test, it is important to check Levene's Test for Equality of Variances first, as that will determine which row of the output from the Independent Samples Test table to report. This is because the correct values of the *t* statistic, *df*, p-value and the confidence interval will be determined based on whether or not the equal variances assumption is met.

In particular, start by looking at the p-value shown in the second column of numbers in the Independent Samples Test table.



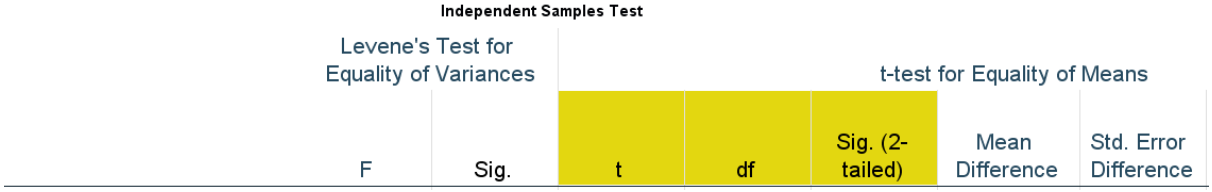
Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference

If it is greater than or equal to .050, equal variances can be assumed. In that case, report information from the first row of the table

If it is less than .050, equal variances can **not** be assumed. In that case, report information from the second row of the table.

In both cases, the next three columns of the table (t, df and sig (2 tailed)) then show the actual *t* statistic, degrees of freedom and *p*-value that are included in the report and that are used in making a decision about whether or not the observed difference in **means** is significant or not significant.



Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference

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Example 1

A nutritionist believes there is a difference in the average number of serves of vegetables consumed per day by Australian men and women. A study was conducted in which a random sample of Australian men and women were asked how many serves of vegetables they consume per day. The results shown below were produced using SPSS.

Does this data provide sufficient evidence to conclude the average amount of serves of vegetables consumed per day differs for Australian men and women? Write a report on the results of this study, testing at an alpha level of .05

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Number of serves of Vegetables per day	Male	974	2.42	1.377	.044
	Female	1026	2.59	1.386	.043

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
Number of serves of Vegetables per day	Equal variances assumed	.008	.929	-2.826	1998	.005	-.175	.062	-.296	-.053
	Equal variances not assumed			-2.826	1993.9	.005	-.175	.062	-.296	-.053

Report

A nutritionist hypothesised that there is a difference in the average number of serves of vegetables consumed per day by Australian men and women.

For a random sample of 2000 Australian adults, the average number of serves of vegetables consumed per day by men (M = 2.42, s = 1.38, n = 974) was lower than the average number of serves consumed per day by women (M = 2.59, s = 1.39, n = 1026) and an independent samples t-test shows this difference in mean number of vegetables consumed per day is significant, $t(1998) = 2.83$, $p = .005$

The 95% confidence interval shows that average daily vegetable consumption of Australian males is between 0.05 and 0.30 serves less than for females.

As expected, there is a difference in the average number of serves of vegetables consumed per day by Australian men and women, with Australian men consuming fewer serves of vegetables per day than Australian women.

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Example 2

Health researchers hypothesised that the average BMI of Australian men is higher than that of Australian women. For a random sample of Australian adults, the results shown below were obtained using SPSS.

Does this data provide sufficient evidence to conclude that the average BMI of Australian men is higher than that of Australian women? Write a report on the results of this study, testing at an alpha level of .05

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Body Mass Index	Male	871	28.211	5.16438	.17499
	Female	845	26.119	4.96620	.17084

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
Body Mass Index	Equal variances assumed	.84	.360	8.55	1714	.000	2.0928	.24470	1.61	2.57
	Equal variances not assumed			8.56	1714	.000	2.0928	.24456	1.61	2.57

Report

Health researchers hypothesised that the average BMI of Australian men is higher than that of Australian women.

For a random sample of 1716 Australian adults, the average BMI of the men (M = 28.21 kg/m^2, s = 5.16 kg/m^2, n = 871) was higher than the average BMI of the women (M = 26.12 kg/m^2, s = 4.97 kg/m^2, n = 845) and an independent samples t-test shows this difference in mean BMI is significant, $t(1714) = 8.55$, $p < .001$

The 95% confidence interval shows that average BMI of Australian men is between 1.61 and 2.57 kg/m^2 higher than for Australian women.

As expected, the average BMI of Australian men is higher than that of Australian women

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Example 3

A researcher hypothesised that there is a difference in the average number of steps taken per day by Australian adults who are currently on a diet and by those who are not on a diet. For a random sample of Australian adults, the results shown below were obtained using SPSS.

Does this data provide sufficient evidence to conclude that there is a difference in the average number of steps taken per day by Australian adults who are currently on a diet and by those who are not on a diet? Write a report on the results of this study, testing at an alpha level of .05

Group Statistics

	On a diet?	N	Mean	Std. Deviation	Std. Error Mean
Steps per day	Currently on a diet	244	6387.20	4005.710	256.439
	Not currently on a diet	1628	6613.12	4399.461	109.037

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
Steps per day	Equal variances assumed	.370	.543	-.757	1870	.449	-225.93	298.64	-811.63	359.78
	Equal variances not assumed			-.811	337.16	.418	-225.93	278.66	-774.05	322.20

Report

A researcher hypothesised that there is a difference in the average number of steps taken per day by Australian adults who are currently on a diet and by those who are not on a diet.

For a random sample of 1872 Australian adults, the average number of steps taken per day by those who were currently on a diet (M = 6387.20, s = 4005.71, n = 244) was lower than for those not currently on a diet (M = 6613.12, s = 4399.46, n = 1628), however an independent samples t-test shows this difference in mean number of steps taken per day is not significant, $t(1870) = 0.76$, $p = .449$. The 95% confidence interval shows that average number of steps taken per day by Australian adults who are currently on a diet is between 811.63 less and 359.78 steps more than for those who are not currently on a diet.

There is no evidence to suggest any difference in the average number of steps taken per day by Australian adults who are currently on a diet and those who are not on a diet.