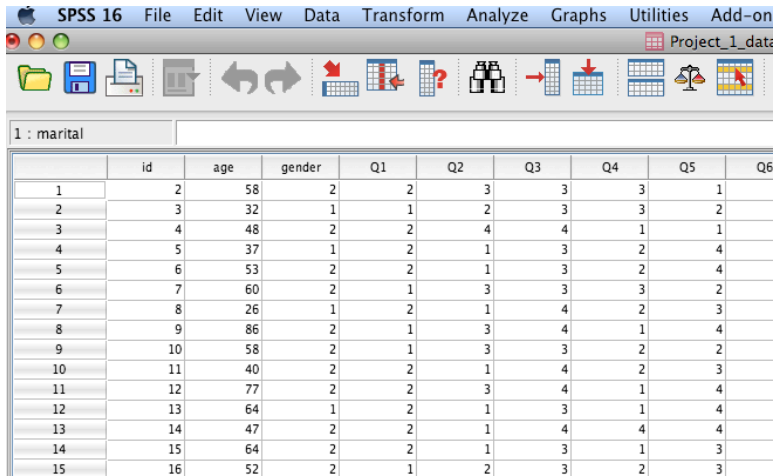


Psych./Neuro. 201: Psychological Statistics/Methods SPSS Instructions for Independent samples *t* tests

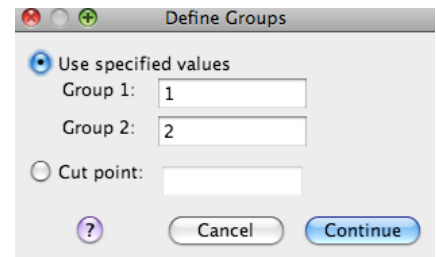
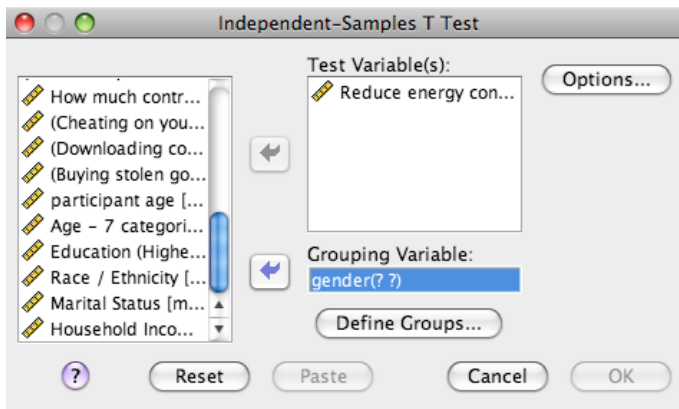
Independent Samples *t* Test

This handout uses data from the Hamilton Environmental Survey to illustrate how to conduct an independent samples *t* test. We will examine gender differences in the frequency of performing behaviors that reduce energy consumption at home (e.g., adjusting thermostat, using less hot water). The first several cases of the file appear as follows:



	id	age	gender	Q1	Q2	Q3	Q4	Q5	Q6
1	2	58	2	2	3	3	3	1	
2	3	32	1	1	2	3	3	2	
3	4	48	2	2	4	4	1	1	
4	5	37	1	2	1	3	2	4	
5	6	53	2	2	1	3	2	4	
6	7	60	2	1	3	3	3	2	
7	8	26	1	2	1	4	2	3	
8	9	86	2	1	3	4	1	4	
9	10	58	2	1	3	3	2	2	
10	11	40	2	2	1	4	2	3	
11	12	77	2	2	3	4	1	4	
12	13	64	1	2	1	3	1	4	
13	14	47	2	2	1	4	4	4	
14	15	64	2	2	1	3	1	3	
15	16	52	2	1	2	3	2	3	

To conduct an independent samples *t* test, go to the “Analyze” menu and click on “compare means” and then “independent samples *t* test.” Click on the DV you want to analyze (in this case, “reduce energy consumption, which is question #6) and click on the arrow to put it in the “test variable(s)” box. Click on your IV (gender) and put it in the “grouping variable” box (see example below).



Notice the question marks next to gender in the Grouping Variable box. Click on “Define Groups” (you’ll see the box above on the right) to tell SPSS what numbers are used to represent each of the two groups (e.g., 1 = male, 2 = female). Once you’ve done so, click “Continue” and then “OK.” SPSS will bump you to the Output window where you can examine the results of the *t* test (see below).

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Reduce energy consumption at home (e.g., using less hot water, using a clothesline instead of dryer, unplugging appliances not in use, only running the dishwasher with a full load, adjusting the thermostat)	Male	851	2.81	.904	.031
	Female	947	3.07	.863	.028

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	95% Confidence Interval of the Difference	
									Lower	Upper
Reduce energy consumption at home	Equal variances assumed	7.630	.006	-6.284	1796	.000	-.262	.042	-.344	-.180
	Equal variances not assumed			-6.268	1755.184	.000	-.262	.042	-.344	-.180

Notice that SPSS computes the means and standard deviations for the two levels of your independent variable. Before you examine the results of the actual *t* test, you should check the results for Levene’s Test for Equality of Variances, which assesses whether the variances of the two groups are significantly different from each other (i.e., whether the homogeneity of variance assumption has been violated). If the *p* value for the Levene’s test (in the “Sig.” column) is greater than .05, then the variances are *not* significantly different from one another (i.e., the homogeneity of variance assumption has been satisfied), and you may use the *t* value and degrees of freedom in the row marked “equal variances assumed.” If the significance value for Levene’s Test is less than .05, you will instead need to use the values reported in the row labeled “equal variances not assumed” (you can round degrees of freedom to the nearest whole number).

In the output shown here, the variances are significantly different, so we need to use the *t* test results from the row labeled “equal variances not assumed.” We see that the observed *t*, with 1755 df, is -6.27, and the *p* value is .000. Since $p < .05$, this test is statistically significant. We’d now look at the means to determine which group had the higher mean. It looks like women report a significantly greater frequency of behaviors that reduce energy consumption at home compared to men. When you’re writing the results of an independent samples *t* test, be sure to include the *t* (rounded to two decimal places), df, *p* value, and the *M* and *SD* for each group. See p. 314 of your text for an example.

Important details for writing a Results section involving an independent samples *t* test:

- You should italicize *M*, *SD*, *t*, and *p*.
- Current APA Style is to report the exact *p* value (e.g., $p = .004$) unless it is $< .001$.
- When $p > .05$, report that the difference was NONsignificant, not INsignificant.
- Round everything to 2 decimal places, except the *p* value, which can be up to 3 decimal places.