

## Interpreting an Independent Samples *t*-test in SPSS

**Group Statistics**

		N	Mean	Std. Deviation	Std. Error Mean
Client Age	Female	120	32.48	7.399	.675
	Male	301	30.43	9.646	.556

Indicates number of subjects in the analysis (120 females and 301 males)

Indicates individual group means (females = 32.48 and males = 30.43)

**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
Client Age	Equal variances assumed	14.534	.000	2.094	419	.037	2.050	.979	.126	3.973
	Equal variances not assumed			2.343	283.332	.020	2.050	.875	.328	3.772

Indicates the probability of error (*p*)

**Since the probability of error is < .05, the analyst must reject the null hypothesis of no difference and conclude that there is a significant difference between the mean ages of males and females.**

# Interpreting a One-way Analysis of Variance (ANOVA) in SPSS

## Descriptives

Total Prior Convictions

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
8th Grade or Below	28	2.89	2.615	.494	1.88	3.91	0	12
9th Grade Up (No Graduation)	146	2.45	1.558	.129	2.19	2.70	0	6
Graduated High School	112	1.87	1.359	.128	1.61	2.12	0	5
G.E.D. Certificate	47	2.45	1.472	.215	2.01	2.88	0	6
Some College	79	1.90	1.744	.196	1.51	2.29	0	9
Bachelor's Degree	11	1.36	1.629	.491	.27	2.46	0	5
Total	423	2.19	1.656	.081	2.03	2.35	0	12

Indicates number of subjects in the analysis (e.g. 112 subjects graduated high school)

Indicates individual group means (e.g. subjects possessing a G.E.D. had, on average, 2.45 prior convictions)

## ANOVA

Total Prior Convictions

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	52.406	5	10.481	3.955	.002
Within Groups	1105.084	417	2.650		
Total	1157.489	422			

Indicates the probability of error ( $p$ )

Since the probability of error is  $< .05$ , the analyst must reject the null hypothesis of no difference and conclude that there are significant differences in mean prior convictions among education categories.

# Interpreting a Tukey's Post-hoc analysis in SPSS

## Multiple Comparisons

Dependent Variable: Total Prior Convictions  
Tukey HSD

(I) Highest Year of Education Completed	(J) Highest Year of Education Completed	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
8th Grade or Below	9th Grade Up (No Graduation)	.448	.336	.767	-.51	1.41
	Graduated High School	1.027*	.344	.035	-.04	2.01
	G.E.D. Certificate	.446	.389	.861	-.67	1.56
	Some College	.994	.358	.063	-.03	2.02
	Bachelor's Degree	1.529	.579	.090	-.13	3.19
9th Grade Up (No Graduation)	8th Grade or Below	-.448	.336	.767	-1.41	.51
	Graduated High School	.579	.204	.054	-.01	1.16
	G.E.D. Certificate	-.002	.273	1.000	-.78	.78
	Some College	.546	.227	.157	-.10	1.20
	Bachelor's Degree	1.082	.509	.276	-.38	2.54
Graduated High School	8th Grade or Below	-1.027*	.344	.035	-2.01	-.04
	9th Grade Up (No Graduation)	-.579	.204	.054	-1.16	.01
	G.E.D. Certificate	-.581	.283	.315	-1.39	.23
	Some College	-.033	.239	1.000	-.72	.65
	Bachelor's Degree	.502	.514	.925	-.97	1.98
G.E.D. Certificate	8th Grade or Below	-.446	.389	.861	-1.56	.67
	9th Grade Up (No Graduation)	.002	.273	1.000	-.78	.78
	Graduated High School	.581	.283	.315	-.23	1.39
	Some College	.548	.300	.449	-.31	1.41
	Bachelor's Degree	1.083	.545	.352	-.48	2.64
Some College	8th Grade or Below	-.994	.358	.063	-2.02	.03
	9th Grade Up (No Graduation)	-.546	.227	.157	-1.20	.10
	Graduated High School	.033	.239	1.000	-.65	.72
	G.E.D. Certificate	-.548	.300	.449	-1.41	.31
	Bachelor's Degree	.535	.524	.911	-.96	2.04
Bachelor's Degree	8th Grade or Below	-1.529	.579	.090	-3.19	.13
	9th Grade Up (No Graduation)	-1.082	.509	.276	-2.54	.38
	Graduated High School	-.502	.514	.925	-1.98	.97
	G.E.D. Certificate	-1.083	.545	.352	-2.64	.48
	Some College	-.535	.524	.911	-2.04	.96

Indicates a significant difference in prior convictions between the education categories 8<sup>th</sup> grade education or below and Graduated High School

Indicates the same as above

Specifically, since there were significant differences ONLY between 8<sup>th</sup> Grade or Below and Graduated High School...the analyst must modify the hypothesis analysis and conclude that **significant differences in mean number of prior convictions exist between those subjects with an 8<sup>th</sup> grade education or below and subjects who graduated from high school.**

\*. The mean difference is significant at the .05 level.

## Interpreting a Pearson's Product Moment Correlation in SPSS

Correlations

		Total Prior Convictions	Total Violations
Total Prior Convictions	Pearson Correlation	1	.252**
	Sig. (2-tailed)		.000
	N	427	406
Total Violations	Pearson Correlation	.252**	1
	Sig. (2-tailed)	.000	
	N	406	406

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Correlation coefficient ( $r$ ) – examine for strength and direction

Probability of error ( $p$ )

Since the probability of error is  $< .05$ , the analyst must reject the null hypothesis of no directional relationship (or correlation) between total prior convictions and total (program) violations and conclude that there is a significant correlation between total prior convictions and total (program) violations.

Since there IS a significant directional relationship (correlation) between the two variables, the analyst must examine  $r$  (the correlation coefficient) for strength and direction. Direction is determined by ascertaining the sign of  $r$  (positive or negative). Strength is determined by the absolute value of  $r$  and its approximate distance to 1.

In this case,  $r$  is positive – indicating a POSITIVE correlation between total prior convictions and total (program) violations. This indicates that subjects with greater numbers of prior convictions will likely violate program guidelines at a higher rate.

However, the absolute value of  $r$  is not very close to 1, indicating a somewhat weak correlation. This could lead the analyst to conclude that **ALTHOUGH THERE IS A SIGNIFICANT CORRELATION BETWEEN TOTAL PRIOR CONVICTIONS AND TOTAL (PROGRAM) VIOLATIONS, THE CORRELATION IS RELATIVELY WEAK.**

# Interpreting Crosstabulation and Chi Square ( $\chi^2$ ) in SPSS

Client Race \* Client Sex Crosstabulation

		Client Sex		Total	
		Female	Male		
Client Race	Caucasian	Count	78	151	229
	% within Client Race	34.1%	65.9%	100.0%	
	% within Client Sex	65.0%	50.5%	54.7%	
	% of Total	18.6%	36.0%	54.7%	
African-American	Count	40	147	187	
	% within Client Race	21.4%	78.6%	100.0%	
	% within Client Sex	33.3%	49.2%	44.6%	
	% of Total	9.5%	35.1%	44.6%	
Hispanic	Count	0	1	1	
	% within Client Race	.0%	100.0%	100.0%	
	% within Client Sex	.0%	.3%	.2%	
	% of Total	.0%	.2%	.2%	
Native American	Count	1	0	1	
	% within Client Race	100.0%	.0%	100.0%	
	% within Client Sex	.8%	.0%	.2%	
	% of Total	.2%	.0%	.2%	
Other	Count	1	0	1	
	% within Client Race	100.0%	.0%	100.0%	
	% within Client Sex	.8%	.0%	.2%	
	% of Total	.2%	.0%	.2%	
Total	Count	120	299	419	
	% within Client Race	28.6%	71.4%	100.0%	
	% within Client Sex	100.0%	100.0%	100.0%	
	% of Total	28.6%	71.4%	100.0%	

Indicates that 65.9% of Caucasians are Male

Indicates that 50.5% of Males are Caucasians

If you get confused as to which percentage represents what, use RAW numbers to calculate the desired percentage:

**What percentage of CAUCASIANS are MALE?**

# of Male Caucasians = 151  
# of Caucasians = 229

**$151 / 229 = .6593$  OR 65.9%**

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.487 <sup>a</sup>	4	.009
Likelihood Ratio	13.956	4	.007
Linear-by-Linear Association	2.094	1	.148
N of Valid Cases	419		

Probability of error ( $p$ )

Since the probability of error is  $< .05$ , the analyst must reject the null hypothesis of no relationship and conclude that there is a significant relationship between race and gender.

a. 6 cells (60.0%) have expected count less than 5. The minimum expected count is .29.