

REPEATED MEASURES ANOVA

To perform a repeated measures ANOVA (one-way), specify the variables that represent the levels of the within-subjects factor (here, ach1 to ach5). On the second line, provide a label for the factor (here, accuracy) that is not itself a variable name but is less than 8 characters, and then state the number of levels of the factor (here, 5). The third line requests descriptive statistics for each level of the factor. On the fourth line, restate the name of the factor (here, accuracy).

```
glm ach1 ach2 ach3 ach4 ach5  
  /wsfactor accuracy 5  
  /print desc  
  /wsdesign accuracy .
```

You should skip over some portions of the output, concerning yourself only with *Descriptive Statistics and Tests of Within-Subjects Effects*.

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

ACCURACY	Dependent Variable
1	ACH1
2	ACH2
3	ACH3
4	ACH4
5	ACH5

Descriptive Statistics

	Mean	Std. Deviation	N
Ach, cases 1-20	.42957	.15849	105
Ach, cases 21-40	.61669	.12547	105
Ach, cases 41-60	.39004	.10669	105
Ach, cases 61-80	.36606	.11822	105
Ach, cases 81-100	.12831	.14659	105

This part of the output (*Descriptive Statistics*) shows you the sample size, mean, and standard deviation for each level of the within-subjects factor.

Multivariate Tests^b

Effect		Value	F	Hypothesis df	Error df	Sig.
ACCURACY	Pillai's Trace	.894	212.413 ^a	4.000	101.000	.000
	Wilks' Lambda	.106	212.413 ^a	4.000	101.000	.000
	Hotelling's Trace	8.412	212.413 ^a	4.000	101.000	.000
	Roy's Largest Root	8.412	212.413 ^a	4.000	101.000	.000

a. Exact statistic

b.

Design: Intercept

Within Subjects Design: ACCURACY

Mauchly's Test of Sphericity^b

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
ACCURACY	.693	37.601	9	.000

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

Mauchly's Test of Sphericity^b

Measure: MEASURE_1

Within Subjects Effect	Epsilon ^a		
	Greenhouse-Geisser	Huynh-Feldt	Lower-bound
ACCURACY	.848	.880	.250

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b.

Design: Intercept

Within Subjects Design: ACCURACY

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
ACCURACY	Sphericity Assumed	12.803	4	3.201	236.034	.000
	Greenhouse-Geisser	12.803	3.391	3.776	236.034	.000
	Huynh-Feldt	12.803	3.519	3.638	236.034	.000
	Lower-bound	12.803	1.000	12.803	236.034	.000
Error(ACCURACY)	Sphericity Assumed	5.641	416	1.356E-02		
	Greenhouse-Geisser	5.641	352.635	1.600E-02		
	Huynh-Feldt	5.641	365.957	1.542E-02		
	Lower-bound	5.641	104.000	5.424E-02		

This part of the output (Tests of Within-Subjects Effects) shows you the ANOVA summary information, which includes SS, df, MS, F, and p (labeled "Sig."): $F(4, 416) = 236.03$, $p < .001$, revealing a reliable difference across levels of the factor.

To determine which levels differ reliably from one another, a post-hoc test needs to be conducted. Unfortunately, SPSS will not compute post-hoc tests for repeated-measures factors, so you'll need to do this by hand (consult any Statistics textbook).

For a simple Tukey test, the information that you'll need is here, so it's an easy calculation. In this case, $MS_{within} = .01356$ (1.356E-02 appears under Mean Square on the Error line); $n = 105$ (the number of scores, which you can get from the Descriptive Statistics table above); $k = 5$ (there are five levels of the factor); and $df(\text{for } MS_{error}) = 416$ (this is the df value for the Error line). Using a table, you'd see that $q = 3.86$ (using $k = 5$, $df = \text{infinity}$ (closest value to 416)), which means $HSD = .044$. Referring back to the Descriptive Statistics table, any levels whose means differ by at least .044 are reliably different from one another at the .05 level.

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	ACCURACY	Type III Sum of Squares	df	Mean Square	F	Sig.
ACCURACY	Linear	7.643	1	7.643	374.073	.000
	Quadratic	3.140	1	3.140	235.703	.000
	Cubic	.420	1	.420	39.339	.000
	Order 4	1.600	1	1.600	163.098	.000
Error(ACCURACY)	Linear	2.125	104	2.043E-02		
	Quadratic	1.386	104	1.332E-02		
	Cubic	1.110	104	1.068E-02		
	Order 4	1.020	104	9.812E-03		

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	78.276	1	78.276	2338.850	.000
Error	3.481	104	3.347E-02		