

AS1: Assignment 1, ANOVA

RESEARCH SCENARIO:

1. A randomized study was conducted comparing the effects of exercise on weight control. Conditions included the following number of times per week that participants exercised: 0 times, 3 times, 4 times, and 5 times.
 - (a) What is (are) the factor(s) in this study? The amount of times per week the participants exercised
 - (b) How many levels (if any) does (do) the factor(s) have? 4 levels
 - (c) What is the dependent variable? Weight control
2. What is the research design? The One-way Independent Measures ANOVA
3. What is the appropriate hypothesis test to analyze these data? The F-test
4. In which source of variance would you expect the treatment effect?
Variance between are the differences among the means due to the IV
5. In which source of variance would you expect differences simply due to chance?
Variance within are the differences among the means due to ERROR

Below is an SPSS ANOVA followed by a post-hoc test: Based on these results, please answer "a-f":

ANOVA

VAR00001

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	16.267	2	8.13	4.699	.007
Within Groups	37.100	27	1.73		
Total	53.367	29			

Multiple Comparisons

Dependent Variable: VAR00001

Bonferroni

(I) VAR00002	(J) VAR00002	Mean Difference			95% Confidence Interval	
		(I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
1.00	2.00	-1.00000	.52423	.051	-2.3381	.3381
	3.00	-1.80000*	.52423	.006	-3.1381	-.4619
2.00	1.00	1.00000	.52423	.051	-.3381	2.3381
	3.00	-.80000	.52423	.416	-2.1381	.5381
3.00	1.00	1.80000*	.52423	.006	.4619	3.1381
	2.00	.80000	.52423	.416	-.5381	2.1381

*. The mean difference is significant at the 0.05 level.

(a) What is the value of the variance between? 8.13

(b) What is the value of the variance within? 1.73

(c) What is the F value (I know it is not there, calculate it): F= 4.699

(d) Please write the statistical statement for the above SPSS ANOVA results:

Answer: F (2,27) = 4.699, p= 0.007

(e) Is your F test significant? Yes ✓ No _____

(f) If yes, please note where the significance is found:

The data indicate a significant difference between group 1 and group 3. However, there was no statistically significant difference between group 1 and 2, nor group 2 and 3.

RESEARCH SCENARIO 2:

A researcher hypothesizes that performance on a sorting task is affected by the time allotted for practice immediately before the participants perform the sorting task. The researcher randomizes the sample of n=27 participants to a 10 minutes condition, a 20 minutes condition, and a 30 minutes condition, after which all participants complete the sorting task. The grades achieved on the sorting task are noted below:

10 m	20 m	30 m
84	64	90
76	66	91
57	67	69

82	70	65
77	65	79
65	61	81
60	64	87
64	61	69
72	59	74

1. What is the factor in this study? The time condition allotted for practice
2. What is the dependent variable in this study? The performance on a sorting task
3. What is the research hypothesis?
The amount of time allotted for practice will have an effect on the performance on a sorting task.
4. What is the null hypothesis?
The amount of time allotted for practice will not have an effect on the performance on a sorting task.
5. What is the name of the research design? One- way Independent Measures ANOVA
6. Run the appropriate SPSS test and cut and paste your SPSS results here:

Descriptives

VAR00001

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1.00	9	70.7778	9.70538	3.23513	63.3176	78.2380	57.00	84.00
2.00	9	64.1111	3.40751	1.13584	61.4919	66.7304	59.00	70.00
3.00	9	78.3333	9.68246	3.22749	70.8907	85.7759	65.00	91.00
Total	27	71.0741	9.82119	1.89009	67.1889	74.9592	57.00	91.00

ANOVA

VAR00001

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	911.407	2	455.704	6.851	.004
Within Groups	1596.444	24	66.519		
Total	2507.852	26			

Multiple Comparisons

Dependent Variable: VAR00001
Scheffe

(I) VAR00002	(J) VAR00002	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.00	2.00	6.66667	3.84472	.243	-3.3633	16.6966
	3.00	-7.55556	3.84472	.167	-17.5855	2.4744
2.00	1.00	-6.66667	3.84472	.243	-16.6966	3.3633
	3.00	-14.22222*	3.84472	.004	-24.2522	-4.1922
3.00	1.00	7.55556	3.84472	.167	-2.4744	17.5855
	2.00	14.22222*	3.84472	.004	4.1922	24.2522

*. The mean difference is significant at the 0.05 level.

VAR00001

Scheffe^a

VAR00002	N	Subset for alpha = 0.05	
		1	2
2.00	9	64.1111	
1.00	9	70.7778	70.7778
3.00	9		78.3333
Sig.		.243	.167

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 9.000.

7. Based on your SPSS results, what is MS between? 455.704

8. Based on your SPSS results, what is MS within? 66.519

9. What is the F value? F = 6.851, p= 0.004

10. Please write the “statistical statement” for your SPSS analysis:

Answer: F (2, 24) = 6.851, p = 0.004

11. Were your results significant? Yes ✓ No _____

12. If yes, which groups showed a statistical difference?

The data indicate a significant difference between the 20m and 30m conditions. However, there is no statistically significant difference between the 10m and the 20m group, nor between the 10m and the 30m group, F (2, 24) = 6.851, p= 0.004.