

## AS1: Assignment 1, ANOVA

### RESEARCH SCENARIO:

1. A randomized study was conducted comparing the effects of repetition on recall. Conditions included the following number of repetitions per list of words: 5 times, 10 times, 15 times, and 20 times.
  - (a) What is (are) the factor(s) in this study? **Number of repetitions per list of words.**
  - (b) How many levels (if any) does (do) the factor(s) have? **4**
  - (c) What is the dependent variable? **Recall**
2. What is the research design? **One way independent Measures ANOVA**
3. What is the appropriate hypothesis test to analyze these data? **F Test**
4. In which source of variance would you expect the treatment effect? **Between-treatments variance**

Below is an SPSS ANOVA: Based on these results, please answer a-f

VAR00001

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	16.267	2	8.133		.007
Within Groups	37.100	27	1.374		
Total	53.367	29			

### Multiple Comparisons

Dependent Variable: VAR00001  
Bonferroni

(I) VAR00002	(J) VAR00002	Mean Difference (I- J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.00	2.00	-1.00000	.52423	.201	-2.3381	.3381
	3.00	-1.80000*	.52423	.006	-3.1381	-.4619
2.00	1.00	1.00000	.52423	.201	-.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? **8.133**

(b) What is the value of the variance within? **1.374**

(c) What is the F value (I know it is not there, calculate it): **5.919**

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

Answer:  **$F(2, 27) = 5.919, p=.007 < .05$**

(e) Is your F test significant? **Yes**

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

**The data indicate a significant difference between the variable 1 and Variable 3. However, there is no statistically difference between the variable 1 and variable 2, nor between the variable 2 and variable 3.  $F(2,27)=5.919, p=.007 < .05$**

#### RESEARCH SCENARIO 2:

A researcher hypothesizes that exam performance is affected by the amount of time that a student reviews the quiz material immediately prior to the quiz. He randomizes his sample of  $n=30$  participants to a 10 minutes condition, a 20 minutes condition, and a 30 minutes condition, after which all students take the quiz. The data are below:

10 m	20 m	30 m
86	94	92
78	91	91
55	82	68
88	15	65
77	85	78
65	72	81
60	78	83
64	74	69
72	70	74
84	83	83

1. What is the factor in this study? **Amount of time that a student reviews the quiz material immediately prior to quiz.**
2. What is the dependent variable in this study? **Exam performance of students.**
3. What is the research hypothesis? **Exam performance is affected by the amount of time that a student reviews the quiz material immediately prior to the quiz.**
4. What is the null hypothesis?  
**Exam performance is not significantly affected by the amount of time that a student reviews the quiz material immediately prior to the quiz.**
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	10	72.9000	11.52244	3.64372	64.6573	81.1427	55.00	88.00
2.00	10	74.4000	22.28702	7.04777	58.4568	90.3432	15.00	94.00
3.00	10	78.4000	9.35949	2.95973	71.7046	85.0954	65.00	92.00
Total	30	75.2333	15.10351	2.75751	69.5936	80.8731	15.00	94.00

## ANOVA

VAR00001

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	161.667	2	80.833	.338	.716
Within Groups	6453.700	27	239.026		
Total	6615.367	29			

7. Based on your SPSS results, what is MS between? **80.833**

8. Based on your SPSS results, what is MS within? **239.026**

9. What is the F value? **F=.338**

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

Answer:  **$F(2, 27) = .338, p = .716 > .05$**

11. Were your results significant? **No**

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

**There was no significant difference between the data 10m, 20m and 30m.  $F(2, 27) = .338, p = .716 > .05$**