

Understanding Factorial ANOVA SPSS output

Univariate Analysis of Variance (Factorial)

Between-Subjects Factors

		Value Label	N
lesion condition	1	control	15
	2	temporal lobe lesion	15
recall cue condition	1	free recall	10
	2	auditory cue	10
	3	visual cue	10

Descriptive Statistics

Dependent Variable: recall score (# of items recalled)

lesion condition	recall cue condition	Mean	Std. Deviation	N
control	free recall	15.20	2.683	5
	auditory cue	24.80	7.396	5
	visual cue	21.80	6.140	5
	Total	20.60	6.759	15
temporal lobe lesion	free recall	5.00	2.739	5
	auditory cue	4.60	3.050	5
	visual cue	25.60	6.025	5
	Total	11.73	10.872	15
Total	free recall	10.10	5.953	10
	auditory cue	14.70	11.908	10
	visual cue	23.70	6.075	10
	Total	16.17	9.973	30

Tests of Between-Subjects Effects

Dependent Variable: recall score (# of items recalled)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2273.367 ^a	5	454.673	17.865	.000
Intercept	7840.833	1	7840.833	308.088	.000
lesion	589.633	1	589.633	23.168	.000
cue	957.067	2	478.533	18.803	.000
lesion * cue	726.667	2	363.333	14.276	.000
Error	610.800	24	25.450		
Total	10725.000	30			
Corrected Total	2884.167	29			

a. R Squared = .788 (Adjusted R Squared = .744)

Estimated Marginal Means: No need to look at the tables for this section

Post Hoc Tests (Tukey test for recall cue condition main effect)

recall cue condition

Multiple Comparisons

recall score (# of items recalled)

Tukey HSD

(I) recall cue condition	(J) recall cue condition	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
free recall	auditory cue	-4.60	2.256	.125	-10.23	1.03
	visual cue	-13.60*	2.256	.000	-19.23	-7.97
auditory cue	free recall	4.60	2.256	.125	-1.03	10.23
	visual cue	-9.00*	2.256	.002	-14.63	-3.37
visual cue	free recall	13.60*	2.256	.000	7.97	19.23
	auditory cue	9.00*	2.256	.002	3.37	14.63

Based on observed means.

The error term is Mean Square(Error) = 25.450.

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

Homogeneous Subsets

recall score (# of items recalled)

Tukey HSD^{a,b}

recall cue condition	N	Subset	
		1	2
free recall	10	10.10	
auditory cue	10	14.70	
visual cue	10		23.70
Sig.		.125	1.000

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = 25.450.

a. Uses Harmonic Mean Sample Size = 10.000.

b. Alpha = .05.

Now we need to interpret the nature of the significant interaction. We split the file on the lesion variable and conduct two oneway ANOVAs on the recall cue variable.

Oneway

Descriptives

recall score (# of items recalled)

lesion condition		N	Mean	Std. Deviation	Std. Error
control	free recall	5	15.20	2.683	1.200
	auditory cue	5	24.80	7.396	3.308
	visual cue	5	21.80	6.140	2.746
	Total	15	20.60	6.759	1.745
temporal lobe lesion	free recall	5	5.00	2.739	1.225
	auditory cue	5	4.60	3.050	1.364
	visual cue	5	25.60	6.025	2.694
	Total	15	11.73	10.872	2.807

Descriptives cont'd

recall score (# of items recalled)

lesion condition		95% Confidence Interval for Mean		Minimum	Maximum
		Lower Bound	Upper Bound		
control	free recall	11.87	18.53	11	18
	auditory cue	15.62	33.98	17	34
	visual cue	14.18	29.42	17	32
	Total	16.86	24.34	11	34
temporal lobe lesion	free recall	1.60	8.40	2	9
	auditory cue	.81	8.39	1	9
	visual cue	18.12	33.08	21	34
	Total	5.71	17.75	1	34

ANOVA

recall score (# of items recalled)

lesion condition		Sum of Squares	df	Mean Square	F	Sig.
control	Between Groups	241.200	2	120.600	3.633	.058
	Within Groups	398.400	12	33.200		
	Total	639.600	14			
temporal lobe lesion	Between Groups	1442.533	2	721.267	40.750	.000
	Within Groups	212.400	12	17.700		
	Total	1654.933	14			

For the control condition, there was no significant effect of type of cue on recall. For the participants with lesions, there was a significant effect of type of cue on recall.

Post Hoc Tests (Tukey tests)

Homogeneous Subsets for recall score (# of items recalled)

lesion condition=control

Tukey HSD^a

recall cue condition	N	Subset for alpha = 0.05	
		1	
free recall	5	15.20	
visual cue	5	21.80	
auditory cue	5	24.80	
Sig.		.053	

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 5.000.

The ANOVA was not significant for the control participants, so this post-hoc test does not need to be interpreted.

lesion condition=temporal lobe lesion

Tukey HSD^a

recall cue condition	N	Subset for alpha = 0.05	
		1	2
auditory cue	5	4.60	
free recall	5	5.00	
visual cue	5		25.60
Sig.		.988	1.000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 5.000.

For the participants with lesions, providing visual cues resulted in better recall than providing either auditory cues or no cues, which did not differ from each other.

The main effect of type of cue is qualified by the significant interaction. That pattern only holds for the participants with a temporal lobe lesion.