

Chapter 18 Problems

Because of the amount of coding required for the corresponding MRC analyses, only ANOVA was used for these problems.

1.

Source	SS	df	MS	F
B at a ₁	86.75	3	28.92	22.15*
B x S at a ₁	11.75	9	1.31	
S at a ₁	165.25	3	55.08	
B at a ₂	37.25	3	12.42	21.29*
B x S at a ₂	5.25	9	0.58	
S at a ₂	155.25	3	51.75	
B at a ₃	11.25	3	3.75	0.57
B x S at a ₃	59.25	9	6.58	
S at a ₃	39.25	3	13.08	

* $p < .05$; all information is from SPSS output

2.

Source	SS	df	MS	F
A at b ₁	3.50	2	1.75	0.15
S/A at b ₁	108.50	9	12.06	
A at b ₂	4.17	2	2.08	0.20
S/A at b ₂	94.75	9	10.53	
A at b ₃	12.67	2	6.33	0.38
S/A at b ₃	148.25	9	16.47	
A at b _y	147.17	2	73.58	7.84*
S/A at b _y	84.50	9	9.39	

* $p < .05$; all information is from SPSS output

3.

Source	SS	df	MS	F
A _{comp} x B _{comp} (1)	95.06	1	95.06	64.57*
B _{comp} x S/A (1)	13.25	9	1.47	
A _{comp} x B _{comp} (2)	18.06	1	18.06	12.27*
B _{comp} x S/A (2)	13.25	9	1.47	

* $p < .05$; all SS and df are from SPSS output

General Linear Model - B at a1

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
day	Sphericity Assumed	86.750	3	28.917	22.149	.000
	Greenhouse-Geisser	86.750	1.408	61.616	22.149	.007
	Huynh-Feldt	86.750	2.281	38.031	22.149	.001
	Lower-bound	86.750	1.000	86.750	22.149	.018
Error(day)	Sphericity Assumed	11.750	9	1.306		
	Greenhouse-Geisser	11.750	4.224	2.782		
	Huynh-Feldt	11.750	6.843	1.717		
	Lower-bound	11.750	3.000	3.917		

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	1806.250	1	1806.250	32.791	.011
Error	165.250	3	55.083		

General Linear Model - B at a2

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
day	Sphericity Assumed	37.250	3	12.417	21.286	.000
	Greenhouse-Geisser	37.250	1.830	20.357	21.286	.003
	Huynh-Feldt	37.250	3.000	12.417	21.286	.000
	Lower-bound	37.250	1.000	37.250	21.286	.019
Error(day)	Sphericity Assumed	5.250	9	.583		
	Greenhouse-Geisser	5.250	5.490	.956		
	Huynh-Feldt	5.250	9.000	.583		
	Lower-bound	5.250	3.000	1.750		

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	992.250	1	992.250	19.174	.022
Error	155.250	3	51.750		

General Linear Model - B at a3

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
day	Sphericity Assumed	11.250	3	3.750	.570	.649
	Greenhouse-Geisser	11.250	1.654	6.804	.570	.569
	Huynh-Feldt	11.250	3.000	3.750	.570	.649
	Lower-bound	11.250	1.000	11.250	.570	.505
Error(day)	Sphericity Assumed	59.250	9	6.583		
	Greenhouse-Geisser	59.250	4.961	11.944		
	Huynh-Feldt	59.250	9.000	6.583		
	Lower-bound	59.250	3.000	19.750		

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	1406.250	1	1406.250	107.484	.002
Error	39.250	3	13.083		

Univariate Analysis of Variance - A at b1

Tests of Between-Subjects Effects

Dependent Variable: Learning test score - Day 1

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3.500 ^a	2	1.750	.145	.867
Intercept	768.000	1	768.000	63.705	.000
drug	3.500	2	1.750	.145	.867
Error	108.500	9	12.056		
Total	880.000	12			
Corrected Total	112.000	11			

a. R Squared = .031 (Adjusted R Squared = -.184)

Univariate Analysis of Variance - A at b2

Tests of Between-Subjects Effects

Dependent Variable: Learning test score - Day 2

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	4.167 ^a	2	2.083	.198	.824
Intercept	1064.083	1	1064.083	101.074	.000
drug	4.167	2	2.083	.198	.824
Error	94.750	9	10.528		
Total	1163.000	12			
Corrected Total	98.917	11			

a. R Squared = .042 (Adjusted R Squared = -.171)

Univariate Analysis of Variance - A at b3

Tests of Between-Subjects Effects

Dependent Variable: Learning test score - Day 3

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	12.667 ^a	2	6.333	.384	.691
Intercept	1180.083	1	1180.083	71.641	.000
drug	12.667	2	6.333	.384	.691
Error	148.250	9	16.472		
Total	1341.000	12			
Corrected Total	160.917	11			

a. R Squared = .079 (Adjusted R Squared = -.126)

Univariate Analysis of Variance - A at b4

Tests of Between-Subjects Effects

Dependent Variable: Learning test score - Day 4

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	147.167 ^a	2	73.583	7.837	.011
Intercept	1160.333	1	1160.333	123.586	.000
drug	147.167	2	73.583	7.837	.011
Error	84.500	9	9.389		
Total	1392.000	12			
Corrected Total	231.667	11			

a. R Squared = .635 (Adjusted R Squared = .554)

General Linear Model - Part a - Acomp x Bcomp

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
day	Sphericity Assumed	10.563	1	10.563	22.043	.003
	Greenhouse-Geisser	10.563	1.000	10.563	22.043	.003
	Huynh-Feldt	10.563	1.000	10.563	22.043	.003
	Lower-bound	10.563	1.000	10.563	22.043	.003
day * drug	Sphericity Assumed	95.063	1	95.063	198.391	.000
	Greenhouse-Geisser	95.063	1.000	95.063	198.391	.000
	Huynh-Feldt	95.063	1.000	95.063	198.391	.000
	Lower-bound	95.063	1.000	95.063	198.391	.000
Error(day)	Sphericity Assumed	2.875	6	.479		
	Greenhouse-Geisser	2.875	6.000	.479		
	Huynh-Feldt	2.875	6.000	.479		
	Lower-bound	2.875	6.000	.479		

General Linear Model - Part a - Bcomp x S/A

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
day	Sphericity Assumed	20.167	1	20.167	13.698	.005
	Greenhouse-Geisser	20.167	1.000	20.167	13.698	.005
	Huynh-Feldt	20.167	1.000	20.167	13.698	.005
	Lower-bound	20.167	1.000	20.167	13.698	.005
day * drug	Sphericity Assumed	95.583	2	47.792	32.462	.000
	Greenhouse-Geisser	95.583	2.000	47.792	32.462	.000
	Huynh-Feldt	95.583	2.000	47.792	32.462	.000
	Lower-bound	95.583	2.000	47.792	32.462	.000
Error(day)	Sphericity Assumed	13.250	9	1.472		
	Greenhouse-Geisser	13.250	9.000	1.472		
	Huynh-Feldt	13.250	9.000	1.472		
	Lower-bound	13.250	9.000	1.472		

General Linear Model - Part b - Acomp x Bcomp

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
day	Sphericity Assumed	76.563	1	76.563	35.680	.001
	Greenhouse-Geisser	76.563	1.000	76.563	35.680	.001
	Huynh-Feldt	76.563	1.000	76.563	35.680	.001
	Lower-bound	76.563	1.000	76.563	35.680	.001
day * drug	Sphericity Assumed	18.063	1	18.063	8.417	.027
	Greenhouse-Geisser	18.063	1.000	18.063	8.417	.027
	Huynh-Feldt	18.063	1.000	18.063	8.417	.027
	Lower-bound	18.063	1.000	18.063	8.417	.027
Error(day)	Sphericity Assumed	12.875	6	2.146		
	Greenhouse-Geisser	12.875	6.000	2.146		
	Huynh-Feldt	12.875	6.000	2.146		
	Lower-bound	12.875	6.000	2.146		

General Linear Model - Part b - Bcomp x S/A

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
day	Sphericity Assumed	20.167	1	20.167	13.698	.005
	Greenhouse-Geisser	20.167	1.000	20.167	13.698	.005
	Huynh-Feldt	20.167	1.000	20.167	13.698	.005
	Lower-bound	20.167	1.000	20.167	13.698	.005
day * drug	Sphericity Assumed	95.583	2	47.792	32.462	.000
	Greenhouse-Geisser	95.583	2.000	47.792	32.462	.000
	Huynh-Feldt	95.583	2.000	47.792	32.462	.000
	Lower-bound	95.583	2.000	47.792	32.462	.000
Error(day)	Sphericity Assumed	13.250	9	1.472		
	Greenhouse-Geisser	13.250	9.000	1.472		
	Huynh-Feldt	13.250	9.000	1.472		
	Lower-bound	13.250	9.000	1.472		