

# Chapter 15 Problems

1a. Contrast codes:

Feedback	Age	A <sub>1</sub>	A <sub>2</sub>	B	A <sub>1</sub> B	A <sub>2</sub> B	Mean
None	Adults	0	2	1	0	2	15.5714
Praise	Adults	1	-1	1	1	-1	16.8571
Reproof	Adults	-1	-1	1	-1	-1	14.4286
None	Children	0	2	-1	0	-2	6.0000
Praise	Children	1	-1	-1	-1	1	5.0000
Reproof	Children	-1	-1	-1	1	1	7.1429

$$\text{Contrast \#1: } \Psi_{A \times B(1)} = \Psi_{A_1 B_1} - \Psi_{A_2 B_1} = (16.8571 - 14.4286) - (5.0000 - 7.1429) = 4.5714$$

$$SS_{A \times B(1)} = [(7)(4.5714)^2] / [(1^2 + 1^2)(1^2 + 1^2)] = 36.5710$$

$$\text{Contrast \#2: } \Psi_{A \times B(2)} = [(2)(15.5714) - 16.8571 - 14.4286] - [(2)(6.0000) - 5.0000 - 7.1429] = 0.0000$$

$$SS_{A \times B(2)} = [(7)(0)^2] / [(2^2 + 1^2 + 1^2)(1^2 + 1^2)] = 0$$

Summary:

Source	SS	df	MS	F
$\Psi_{A \times B(1)}$	36.5710	1	36.5710	12.06 *
$\Psi_{A \times B(2)}$	0.0000	1	0.0000	0.00
S/AB	109.1429	36	3.0317	

\*:  $p < .05$ ;  $F_{crit}(1, 36) = 4.12$ ; Information for S/AB is from SPSS output

1b. Coding vectors A, B and A<sub>2</sub>B can be taken from above.

Summary:

Source	R <sup>2</sup>	df	Mean R <sup>2</sup>	F
$\Psi_{A \times B(1)}$	.0330	1	.0330	12.06 *
$\Psi_{A \times B(2)}$	.0000	1	.0000	0.00
S/AB	1 - .9015 = .0985	36	.002736	

Date: \*:  $p < .05$ ;  $F_{crit}(1, 36) = 4.12$ ; Values of R<sup>2</sup> are from SPSS output.

# Univariate Analysis of Variance - Omnibus analysis

## Descriptive Statistics

Dependent Variable: Number of errors

ANOVA code A - ANOVA code	Mean	Std. Deviation	N	
None	Adult	15.5714	2.07020	7
	Children	6.0000	1.73205	7
	Total	10.7857	5.29410	14
Praise	Adult	16.8571	1.86445	7
	Children	5.0000	1.41421	7
	Total	10.9286	6.35446	14
Reproof	Adult	14.4286	2.07020	7
	Children	7.1429	1.06904	7
	Total	10.7857	4.09838	14
Total	Adult	15.6190	2.15583	21
	Children	6.0476	1.62715	21
	Total	10.8333	5.19811	42

## Tests of Between-Subjects Effects

Dependent Variable: Number of errors

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	998.690 <sup>a</sup>	5	199.738	65.882	.000
Intercept	4929.167	1	4929.167	1625.851	.000
anova_a	.190	2	.095	.031	.969
anova_b	961.929	1	961.929	317.285	.000
anova_a * anova_b	36.571	2	18.286	6.031	.006
Error	109.143	36	3.032		
Total	6037.000	42			
Corrected Total	1107.833	41			

a. R Squared = .901 (Adjusted R Squared = .888)

## Regression - Interaction contrast #1

### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.182 <sup>a</sup>	.033	.009	5.17509

a. Predictors: (Constant), Interaction contrast - Praise vs. reproof, children vs. adults

### ANOVA<sup>b</sup>

Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	36.571	1	36.571	1.366	.249 <sup>a</sup>
	Residual	1071.262	40	26.782		
	Total	1107.833	41			

a. Predictors: (Constant), Interaction contrast - Praise vs. reproof, children vs. adults

b. Dependent Variable: Number of errors

## Regression - Interaction contrast #2

### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.000 <sup>a</sup>	.000	-.025	5.26268

a. Predictors: (Constant), Interaction contrast - Praise & reproof vs. none, children vs. adults

### ANOVA<sup>b</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.000	1	.000	.000	1.000 <sup>a</sup>
	Residual	1107.833	40	27.696		
	Total	1107.833	41			

a. Predictors: (Constant), Interaction contrast - Praise & reproof vs. none, children vs. adults

b. Dependent Variable: Number of errors

## Regression - Omnibus analysis

### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.949 <sup>a</sup>	.901	.888	1.74119

a. Predictors: (Constant), Effect code - Interaction A2\*B1, Effect code - Factor B code 1, Effect code - Factor A code 2, Effect code - Interaction A1\*B1, Effect code - Factor A code 1

### ANOVA<sup>b</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	998.690	5	199.738	65.882	.000 <sup>a</sup>
	Residual	109.143	36	3.032		
	Total	1107.833	41			

a. Predictors: (Constant), Effect code - Interaction A2\*B1, Effect code - Factor B code 1, Effect code - Factor A code 2, Effect code - Interaction A1\*B1, Effect code - Factor A code 1

b. Dependent Variable: Number of errors