

Chapter 10 Problems

1. a. Praise: $\bar{Y} = 5.00$ $s_y = 1.41$
 Reprimand: $\bar{Y} = 7.14$ $s_y = 1.07$
 None: $\bar{Y} = 6.00$ $s_y = 1.73$

b. Source	SS	df	MS	F	p
A	16.10	2	8.05	3.93	.038
S/A	36.86	18	2.05		
Total	52.95	20			

Because the p-value associated with our obtained F-ratio is less than .05, we would conclude that our F-test is significant at the $\alpha = .05$ level. We have good evidence that there is a difference somewhere among the three population means.

c. $\hat{\omega}^2 = [SS_A - (a-1)(MS_{S/A})] / (SS_T + MS_{S/A}) = [16.10 - (2)(2.05)] / (52.95 + 2.05) = .22$

d. $R^2_{y \cdot \max} = SS_A / SS_T = 16.10 / 52.95 = .30$

2. a. $R^2 = .30$, $F(2, 18) = 3.93$, $p = .038$

Our R^2 , F ratio, and p-value are identical to those from the ANOVA, so we draw the same conclusion.

b. From the SPSS output, $\hat{Y}' = 6.05 - 1.05X_1 + 1.10X_2$

c. $\bar{Y}_{\text{Praise}} = 6.05 - 1.05(1) + 1.10(0) = 5.00$

$\bar{Y}_{\text{Reprimand}} = 6.05 - 1.05(0) + 1.10(1) = 7.15$

$\bar{Y}_{\text{None}} = 6.05 - 1.05(-1) + 1.10(-1) = 6.00$

d. The two sets of contrast codes we have used, $(1, 0, -1)$ and $(0, 1, -1)$, are the same codes we would use for effect coding, so our analyses would be identical.

3. Our two sets of dummy codes would be $(1, 0, 0)$ and $(0, 1, 0)$.

$$Y' = 34.50 + 5.50 X_1 - 8.50 X_2$$

$$R^2 = .21, \quad F(2, 33) = 4.28, \quad p = .022$$

The R^2 and F ratio are identical to those reported for contrast coding.

Univariate Analysis of Variance - Problem 10.1

Between-Subjects Factors

	Value Label	N
ANOVA code	1.00 Praise	7
	2.00 Reproof	7
	3.00 None	7

Descriptive Statistics

Dependent Variable: Number of errors

ANOVA code	Mean	Std. Deviation	N
Praise	5.0000	1.41421	7
Reproof	7.1429	1.06904	7
None	6.0000	1.73205	7
Total	6.0476	1.62715	21

Tests of Between-Subjects Effects

Dependent Variable: Number of errors

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	16.095 ^a	2	8.048	3.930	.038
Intercept	768.048	1	768.048	375.093	.000
anova	16.095	2	8.048	3.930	.038
Error	36.857	18	2.048		
Total	821.000	21			
Corrected Total	52.952	20			

a. R Squared = .304 (Adjusted R Squared = .227)

Regression - Problem 10.2

Variables Entered/Removed^b

Model	Variables Entered	Variables Removed	Method
1	Contrast code 2, Contrast code 1	.	Enter

a. All requested variables entered.

b. Dependent Variable: Number of errors

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.551 ^a	.304	.227	1.43095

a. Predictors: (Constant), Contrast code 2, Contrast code 1

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	16.095	2	8.048	3.930	.038 ^a
	Residual	36.857	18	2.048		
	Total	52.952	20			

- a. Predictors: (Constant), Contrast code 2, Contrast code 1
 b. Dependent Variable: Number of errors

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6.048	.312		19.367	.000
	Contrast code 1	-1.048	.442	-.539	-2.372	.029
	Contrast code 2	1.095	.442	.563	2.480	.023

- a. Dependent Variable: Number of errors

Regression - Problem 10.3

Variables Entered/Removed^b

Model	Variables Entered	Variables Removed	Method
1	Dummy code 2, Dummy code 1		Enter

- a. All requested variables entered.
 b. Dependent Variable: Vocabulary scores

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.454 ^a	.206	.158	11.80524

- a. Predictors: (Constant), Dummy code 2, Dummy code 1

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1194.000	2	597.000	4.284	.022 ^a
	Residual	4599.000	33	139.364		
	Total	5793.000	35			

- a. Predictors: (Constant), Dummy code 2, Dummy code 1
 b. Dependent Variable: Vocabulary scores

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	34.500	3.408		10.124	.000
	Dummy code 1	5.500	4.819	.204	1.141	.262
	Dummy code 2	-8.500	4.819	-.316	-1.764	.087

a. Dependent Variable: Vocabulary scores