Performing Regressions in SPSS

A. Binary Logistic Regression

Use "Binary_Exercise" as the dependent variable.

Use "CO_1_CARD" and "CO_2_STREN" as the independent variables.

(1) The impact of the "Enter" model versus the "Block 0: Beginning Block";

Block 0 provides baseline statistics when only the constant (intercept) is included in the model. No predictors (independent variables) are added at this stage. Here, 100% of cases are classified as "High," resulting in 73.8% overall accuracy (proportional to the distribution of the majority class).

Block 0: Beginning Block

Classification Table[a,b]

Observed			Predicted: Binary_Exercise Low	Predicted: Binary_Exercise High	Percentage Correct
Step 0	Binary_Exercise	Low	0	28	.0
		High	0	79	100.0
	Overall Percentage				73.8

a. Constant is included in the model.
b. The cut value is .500

Block 1 block shows the model after including the predictors (CO_1 and CO_2). This allows for evaluation of their impact on the model's performance. The overall percentage of correctly classified cases increases to 77.6%. The sensitivity (correctly predicting "High") improves to 97.5%, but the specificity (correctly predicting "Low") drops to 21.4%.

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	11.615	2	.003
	Block	11.615	2	.003
	Model	11.615	2	.003

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	111.395[a]	.103	.151

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Classification Table[a]

Observed			Predicted: Binary_Exercise Low	Predicted: Binary_Exercise High	Percentage Correct
Step 1	Binary_Exercise	Low	6	22	21.4
		High	2	77	97.5
	Overall Percentage				77.6

a. The cut value is .500

(2) Which variable(s) are significant?

CO_1: Not significant (p = 0.132), suggesting limited contribution to the model.

CO_2: Significant (p = 0.021), indicating that it has a meaningful effect on predicting the outcome.
Constant: Significant (p = 0.042), representing the baseline log-odds.

(3) Which variable has the greatest influence on exercise frequency?

The impact (probability % change, as per the example in the slides -- see the complete slides, not just the video) of moving a person from a 3 to a 5 on the scale associated with CO_2_STREN.

Exp(B)= 1.798, for every 1-unit increase in CO_2, the odds of being classified as "High" (Binary_Exercise = High) are multiplied by 1.798.

Adjusted Odds Ratio=1.7982^2= 3.232

Moving a person from a score of **3 to 5** on the CO_2 scale increases the odds of being classified as "High" by approximately **223.2%** (3.232 times the original odds). This indicates that CO_2 (Strength and Power) has a strong influence on the likelihood of achieving a "High" classification in Binary_Exercise.

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	9.319	1	.002
	Block	9.319	1	.002
	Model	9.319	1	.002

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	113.690[a]	.083	.122

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Classification Table[a]

			Predicted		
			Binary_Exercise		Percentage Correct
	Observed		Low	High	
Step 1	Binary_Exercise	Low	4	24	14.3
		High	2	77	97.5
	Overall Percentage				75.7

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	CO_2 - Strength and Power	.587	.199	8.675	1	.003	1.798
	Constant	-1.114	.743	2.250	1	.134	.328

a. Variable(s) entered on step 1: CO_2 - Strength and Power.

B. Linear Regression

(1) The overall model fit

The model demonstrates statistical significance, with an F-value of 8.008 and a p-value under 0.001. The R^2 of 0.189 and adjusted R^2 of 0.166 reveal that it accounts for only about 19% of the variation in exercise frequency, suggesting its explanatory strength is modest. Though statistically significant, the model's practical applicability may be restricted if more comprehensive variance explanation is needed.

(2) Which variable(s) are significant?

Variable C is the only statistically significant predictor of the outcome, as its p-value is below 0.005.

(3) which variable has the greatest influence on exercise frequency?

Variable C has the strongest impact on exercise frequency, supported by its highest absolute beta value of 0.329.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.435[a]	.189	.166	1.892

a. Predictors: (Constant), M_9 – Exercise, in and of itself, is a pleasurable experience., M_6 – I exercise so I will look attractive to others, M_5 – To me, exercise is a social experience.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	85.968	3	28.656	8.008	<.001[b]
	Residual	368.574	103	3.578		
	Total	454.542	106			

a. Dependent Variable: Frequency of Exercise (Times/Week)

b. Predictors: (Constant), M_9 – Exercise, in and of itself, is a pleasurable experience., M_6 – I exercise so I will look attractive to others, M_5 – To me, exercise is a social experience.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.936	.985		.950	.344
	M_5 – To me, exercise is a social experience.	.361	.184	.194	1.966	.052
	M_6 – I exercise so I will look attractive to others	–.167	.189	–.080	–.881	.380
	M_9 – Exercise, in and of itself, is a pleasurable experience.	.666	.194	.329	3.433	<.001

a. Dependent Variable: Frequency of Exercise (Times/Week)