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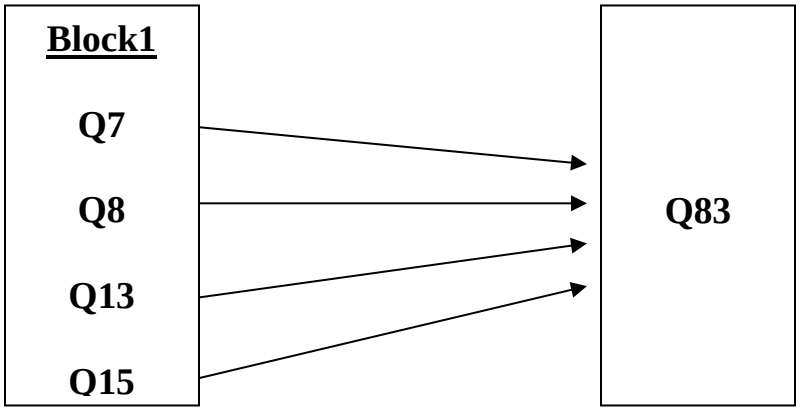
COM 631

Spring 2017

National Community Study Data

Logistic Regression

1- MODEL



Dependent Variable:

Q83. Attended meetings of your town or city council. Y (Recoded as 1)/ N (Recoded as 0).

Independent Variables:

Q7. Value work.

Q8. Value friends.

Q13. Value hobbies and leisure interests.

Q15. Value personal or political philosophy.

(All measured on a 0-10 response scale)

2- Running SPSS.

Click ANALYZE

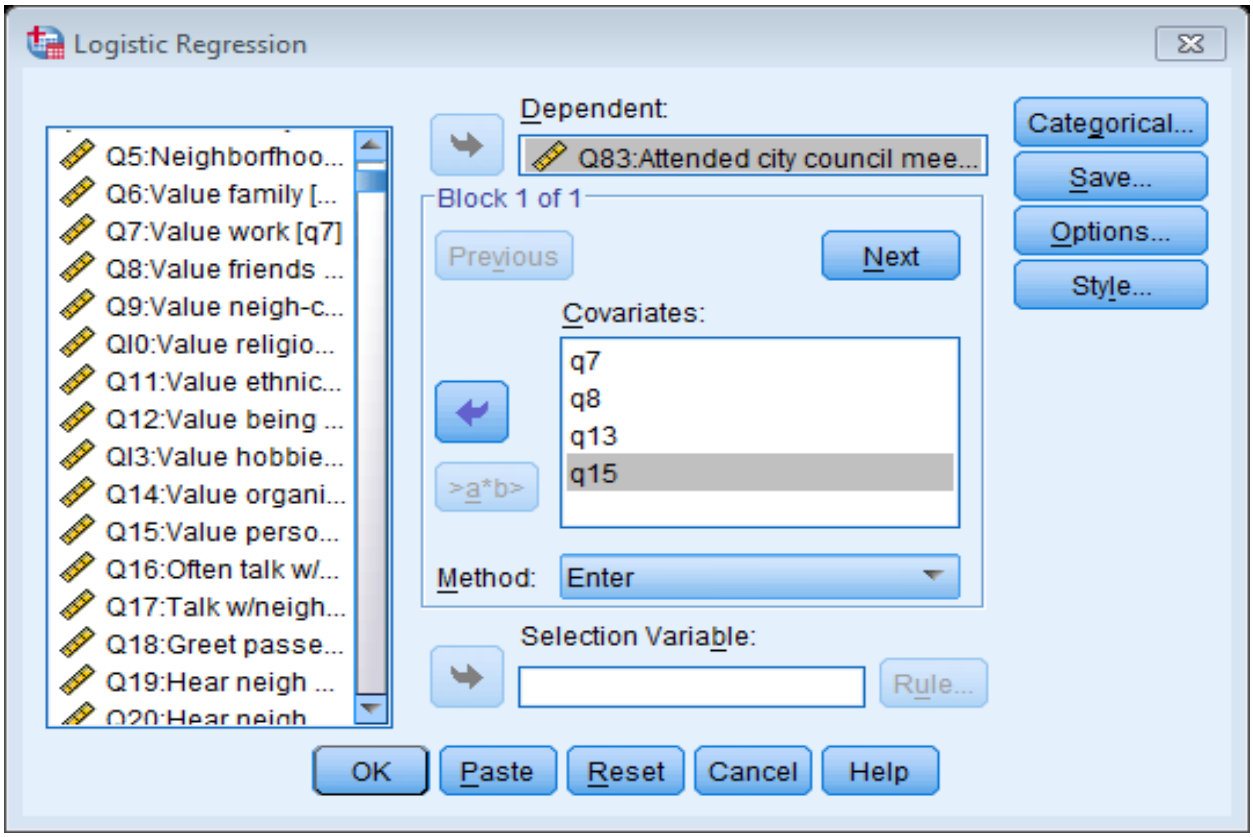
➡ **REGRESSION**

➡ **BINARY LOGISTIC**

DEPENDENT: INSERT DV

COVARIATES: BLOCK 1 (Insert IVs)

METHOD: ENTER

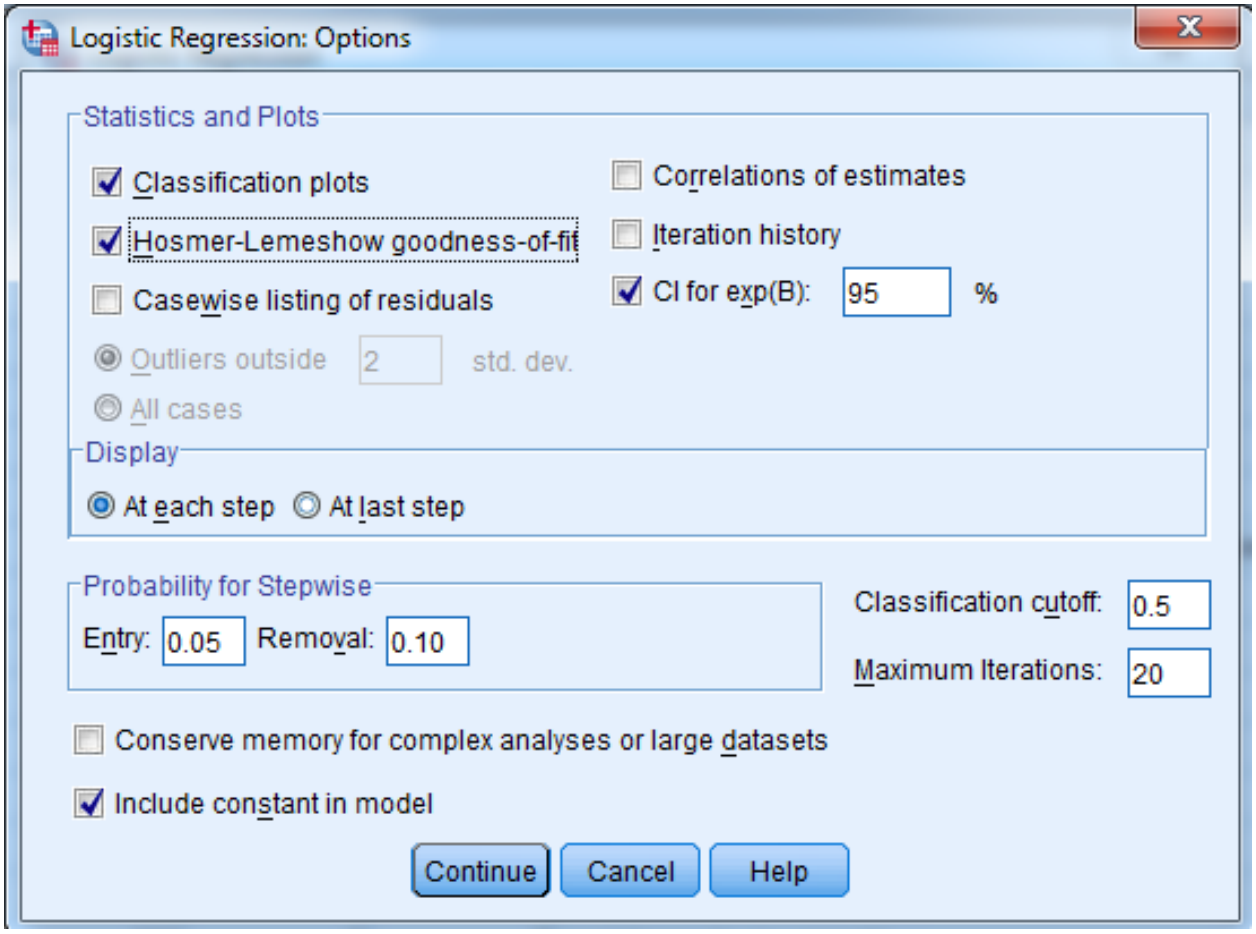


Click OPTION

Select Classification Plots; Hosmer-Lemeshow goodness-of-fit;

CI for expr (B)

Click CONTINUE



Then Click OK (or Paste to have the syntax pasted in a syntax file, which you can then run)

3- SPSS output.

```
GET

LOGISTIC REGRESSION VARIABLES q83
  /METHOD=ENTER q7 q8 q13 q15
  /CLASSPLOT
  /PRINT=GOODFIT CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	393	82.4
	Missing Cases	84	17.6
	Total	477	100.0
Unselected Cases		0	.0
Total		477	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
0=no	0
1=yes	1

Block 0: Beginning Block

Classification Table[a,b]

			Predicted		
			Q83:Attended city council meetings		Percentage
	Observed		0=no	1=yes	Correct
Step 0	Q83:Attended city council meetings	0=no	248	0	100.0
		1=yes	145	0	.0
	Overall Percentage				63.1

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-.537	.105	26.356	1	.000	.585

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	q7	.016	1	.901
		q8	3.220	1	.073
		q13	6.455	1	.011
		q15	.004	1	.947
	Overall Statistics		8.326	4	.080

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	8.258	4	.083
	Block	8.258	4	.083
	Model	8.258	4	.083

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	509.243[a]	.021	.028

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	5.237	8	.732

Contingency Table for Hosmer and Lemeshow Test

		Q83:Attended city council meetings = 0=no		Q83:Attended city council meetings = 1=yes		
		Observed	Expected	Observed	Expected	Total
Step 1	1	29	26.993	8	10.007	37
	2	25	27.219	14	11.781	39
	3	29	26.572	10	12.428	39
	4	27	25.842	12	13.158	39
	5	25	25.270	14	13.730	39
	6	23	25.417	17	14.583	40
	7	20	24.139	19	14.861	39
	8	23	23.367	16	15.633	39
	9	24	22.315	15	16.685	39
	10	23	20.866	20	22.134	43

Classification Table[a]

	Observed		Predicted		
			Q83:Attended city council meetings		Percentage Correct
			0=no	1=yes	
Step 1	Q83:Attended city council meetings	0=no	239	9	96.4
		1=yes	132	13	9.0
	Overall Percentage				64.1

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	q7	.019	.038	.265	1	.606	1.020	.947	1.098
	q8	-.055	.051	1.172	1	.279	.946	.856	1.046
	q13	-.107	.050	4.626	1	.031	.899	.816	.991
	q15	.035	.041	.717	1	.397	1.036	.955	1.123
	Constant	.291	.486	.360	1	.549	1.338		

a. Variable(s) entered on step 1: q7, q8, q13, q15.

Step number: 1

Observed Groups and Predicted Probabilities

```
      40 +
+
         I
I
         I                                      1
I
F        I                                      1
I
R     30 +                                      1
+
E        I                                 1   11
I
Q        I                                 1 1111
I
U        I                               1 1 1111 1
I
E     20 +                               111 1110111 1
+
N        I                               11011010111 1
I
C        I                               01000000111 1 1
I
Y        I                             1 00000000101 0 1
I
      10 +                               0 00000000000 001  1
+
         I                            1 0 0000000000010001 1
I
         I                           00 0100000000000000010       1
I
         I                           00000000000000000000000 1 01 1 10
I
Predicted ---------+---------+---------+---------+---------+---------+-------
--+---------+---------+----------
Prob:
0       .1        .2        .3        .4        .5        .6        .7
.8        .9         1
  Group:
00000000000000000000000000000000000000000000000000000000000011111111111111111111111111111
11111111111111111111
```

Predicted Probability is of Membership for 1=yes
The Cut Value is .50
Symbols: 0 - 0=no
1 - 1=yes
Each Symbol Represents 2.5 Cases.

```
CORRELATIONS
  /VARIABLES=q7 q8 q13 q15 q83
  /PRINT=TWOTAIL NOSIG
  /MISSING=PAIRWISE.
```

Correlations

Correlations

		Q7:Value work	Q8:Value friends	Ql3:Value hobbies-leisure	Q15:Value personal-pol.philosophy	Q83:Attended city council meetings
Q7:Value work	Pearson Correlation	1	.173**	.140**	.132**	.004
	Sig. (2-tailed)		.000	.004	.007	.932
	N	425	422	422	420	401
Q8:Value friends	Pearson Correlation	.173**	1	.370**	.212**	-.093
	Sig. (2-tailed)	.000		.000	.000	.051
	N	422	466	462	458	438
Ql3:Value hobbies-leisure	Pearson Correlation	.140**	.370**	1	.248**	-.125**
	Sig. (2-tailed)	.004	.000		.000	.009
	N	422	462	465	457	436
Q15:Value personal-pol.philosophy	Pearson Correlation	.132**	.212**	.248**	1	.021
	Sig. (2-tailed)	.007	.000	.000		.670
	N	420	458	457	462	434
Q83:Attended city council meetings	Pearson Correlation	.004	-.093	-.125**	.021	1
	Sig. (2-tailed)	.932	.051	.009	.670	
	N	401	438	436	434	441

**. Correlation is significant at the 0.01 level (2-tailed).

4- Tabling.

Table 1. Logistic regression predicting attendance at city council meetings.

	r	Final Exp(B)	Step or Block Chi-Sq	Model -2LL	Cox & Snell R^2	Nag. R^2	Hosmer & Lemeshow Chi-Sq
Block1			8.258[a]	509.243[a]	.021	.028	5.237
Q7-Value work	.004	1.020					
Q8-Value friends	-.093[a]	.946					
Q13-Value hobbies and leisure	-.125**	.899*					
Q15-Value personal or political philosophy	.021	1.036					

[a]- .05 <*p* < .10
* - *p* < .05
** - *p* < .01

Table 2. Classification results.

			Final Predicted Group (Block 1)		
			Q83. Attended meetings of your town or city council.		Percentage Correct
			No	Yes	
Step 1: Actual Group	Q83. Attended meetings of your town or city council.	No	**239**	9	96.4
		Yes	132	**13**	9.0
Overall Percentage					64.1

Press' Q calculation

$Q = [N-(nK)]^2/N(K-1)$

N=total sample size

n= number of observations correctly classified

K= number of groups on the dependent variable

N=393

n=252 (239 + 13)

K=2

([393-(252*2)] ^2)/(393 (2-1))

([393-504] ^2)/ (393 (1))

(-111)^2/393

12321/393

Press' Q =31.351

df =1

Chi-sqcrit (p = .001) =10.83

Critical value of chi-sq at df =1, taken from a standard chi-sq table.

The Press' Q is highly significant because it exceeds the critical value for Chi-sq by a large amount.

5- Write-up.

A logistic regression was applied to predict the probability (or, specifically, odds) of someone attending meetings of their town or city council from variables dealing with values regarding work, friends, hobbies and leisure interests, personal or political philosophy. The dependent variable was recoded into a dummy with 1 being having attended a town or city council meeting and 0 having not ever attended.

Table 1 shows the main logistic regression findings. The single block entered, comprised of valuing work, friends, hobbies and leisure interests, personal or political philosophy, was near-significant (chi-sq. = 8.258; p = .083). The -2LL value was 509.243, which is rather high. The R^2 approximations were .021 and .028, indicating that the "variance explained" in the dependent variable was no more than 3%. The Hosmer and Lemeshow chi-sq. was 5.237 and non-significant**,** which indicates a good model fit.

Within this near-significant block there was only one significant unique contributor/predictor of attendance at city council meetings. It was Q13, "Value hobbies and leisure," with a final Exp(B) of .899 (p = .031). This value of .899 means that there will be a 10.1% decrease in the odds of attending city council meetings for each unit increase in Q13, when controlling for the other three independent variables in the equation.

Table 2 shows the classification results for the analysis. Overall, the percentage correctly classified by this model was 64.1%. To test whether this was significantly greater than chance, a Press' Q was calculated using the total number of included cases after Block 1 (N = 393), the number of dependent variable groups (K = 2), and the total number of correctly predicted cases (n = 252), and was found to be 31.351 (df = 1). The chi-square critical value for df = 1 ($p < .001$) is 10.83, indicating a "Hit rate" for the model of significantly greater than chance.