CHAPTER 8 ANALYSIS EXAMPLES REPLICATION SPSS/PASW V18
LOGISTIC REGRESSION INCLUDING LOGIT, PROBIT AND CLOGLOG REGRESSION

GENERAL NOTES ABOUT ANALYSIS EXAMPLES REPLICATION
These examples are intended to provide guidance on how to use the commands/procedures for analysis of complex sample survey data and assume all data management and other preliminary work is done. The relevant syntax for the procedure of interest is shown first along with the associated output for that procedure(s). In some examples, there may be more than one block of syntax and in this case all syntax is first presented followed by the output produced.

In some software packages certain procedures or options are not available but we have made every attempt to demonstrate how to match the output produced by Stata 10+ in the textbook. Check the ASDA website for updates to the various software tools we cover.

NOTES ABOUT LOGISTIC REGRESSION ANALYSIS IN SPSS/PASW V18 COMPLEX SAMPLES MODULE

SPSS/PASW LOGISTIC/ORDINAL commands can perform most of the analyses presented in Chapter 8 of ASDA. CSORDINAL performs complex survey data ordinal logistic regression as well as Probit and Cloglog regression with binary outcomes. CSLOGISTIC also performs logistic regression with binary outcomes and in this chapter both procedures are used for a comparison of Logit, Probit and Cloglog models.

Some of the fine points of these procedures are the use of a SUBPOP statement for subpopulation analyses, various output statistics specified on the STATISTICS subcommand, and use of an analysis Plan file for all Complex Samples commands. The plan file should be prepared prior to working with any Complex Samples commands and offers the ability to declare weights and design variables to the program. For using the same reference group as Stata v10.1, we use a reverse coding strategy as this is one way to match the omitted categories of Stata (lowest category is omitted by default). Other approaches might be to use individual indicator variables instead but this makes hypothesis testing of categorical variables more challenging. See the examples provided in this chapter's output for implementation of the reverse coding approach.

Regarding the standard errors in the Example 8.1 models run in SPSS: the SE's are slightly different than what is produced in Stata svy: logit due to differing methods of calculating the SE's between SPSS and Stata. In general, the SE's from SPSS will match Stata svy: logistic but not svy: logit, please see the Stata documentation for details.

```
*Analysis Example 8.1 Bivariate Testing of Predictors of MDE: NCS-R Data

* Complex Samples Crosstabs.
CSTABULATE
  /PLAN FILE='F:\applied_analysis_book\SPSS Analysis Examples Replication\Analysis Examples Replication Winter 2010 SPSSv18\ncsr_p2wt.csaplan'
  /TABLES VARIABLES=ag4cat MAR3CAT SEX ED4CAT ald BY mde
  /CELLS ROWPCT
  /STATISTICS SE CIN(95)
  /TEST INDEPENDENCE
  /MISSING SCOPE=TABLE CLASSMISSING=EXCLUDE.

NOTE: CODES FOR AG4CAT 1=18-29 2=30-44 3=45-59 4=60+ YEARS OF AGE, MDE 0=NO 1=YES, MAR3CAT 1=MARRIED 2=PREVIOUSLY MARRIED 3=NEVER MARRIED, SEX 1=MALE
2=FEMALE, ALD 0=NO 1=YES.
```

ag4cat * mde

ag4cat				mde		
				0	1	Total
1	% within ag4cat	Estimate		81.6%	18.4%	100.0%
		Standard Error		.9%	.9%	.0%
		95% Confidence Interval	Lower	79.7%	16.7%	100.0%
			Upper	83.3%	20.3%	100.0%
2	% within ag4cat	Estimate		77.1%	22.9%	100.0%
		Standard Error		1.1%	1.1%	.0%
		95% Confidence Interval	Lower	74.8%	20.7%	100.0%
			Upper	79.3%	25.2%	100.0%
3	% within ag4cat	Estimate		77.7%	22.3%	100.0%
		Standard Error		1.3%	1.3%	.0%
		95% Confidence Interval	Lower	75.0%	19.9%	100.0%
			Upper	80.1%	25.0%	100.0%
4	% within ag4cat	Estimate		88.9%	11.1%	100.0%
		Standard Error		1.0%	1.0%	.0%
		95% Confidence Interval	Lower	86.9%	9.3%	100.0%
			Upper	90.7%	13.1%	100.0%
Total	% within ag4cat	Estimate		80.8%	19.2%	100.0%
		Standard Error		.6%	.6%	.0%
		95% Confidence Interval	Lower	79.5%	17.9%	100.0%
			Upper	82.1%	20.5%	100.0%

Marital Status-3 categories * mde

Marital Status-3 categories				mde		
				0	1	Total
1	% within Marital Status-3 categories	Estimate		82.7%	17.3%	100.0%
		Standard Error		.7%	.7%	.0%
		95% Confidence Interval	Lower	81.1%	15.9%	100.0%
			Upper	84.1%	18.9%	100.0%
2	% within Marital Status-3 categories	Estimate		76.1%	23.9%	100.0%
		Standard Error		1.4%	1.4%	.0%
		95% Confidence Interval	Lower	73.1%	21.1%	100.0%
			Upper	78.9%	26.9%	100.0%
3	% within Marital Status-3 categories	Estimate		80.6%	19.4%	100.0%
		Standard Error		1.2%	1.2%	.0%
		95% Confidence Interval	Lower	78.2%	17.2%	100.0%
			Upper	82.8%	21.8%	100.0%
Total	% within Marital Status-3 categories	Estimate		80.8%	19.2%	100.0%
		Standard Error		.6%	.6%	.0%
		95% Confidence Interval	Lower	79.5%	17.9%	100.0%
			Upper	82.1%	20.5%	100.0%

Sex * mde

Sex				mde		
				0	1	Total
1	% within Sex	Estimate		84.7%	15.3%	100.0%
		Standard Error		.9%	.9%	.0%
		95% Confidence Interval	Lower	82.8%	13.5%	100.0%
			Upper	86.5%	17.2%	100.0%
2	% within Sex	Estimate		77.4%	22.6%	100.0%
		Standard Error		.7%	.7%	.0%
		95% Confidence Interval	Lower	76.0%	21.3%	100.0%
			Upper	78.7%	24.0%	100.0%
Total	% within Sex	Estimate		80.8%	19.2%	100.0%
		Standard Error		.6%	.6%	.0%
		95% Confidence Interval	Lower	79.5%	17.9%	100.0%
			Upper	82.1%	20.5%	100.0%

Years of education-4 categories 1=0-11 2=12 3=13-15 4=16+ * mde

Years of education-4 categories 1=0-11 2=12 3=13-15 4=16+				mde		
				0	1	Total
1	% within Years of education-4 categories 1=0-11 2=12 3=13-15 4=16+	Estimate		83.7%	16.3%	100.0%
		Standard Error		1.2%	1.2%	.0%
		95% Confidence Interval	Lower	81.1%	14.0%	100.0%
			Upper	86.0%	18.9%	100.0%
2	% within Years of education-4 categories 1=0-11 2=12 3=13-15 4=16+	Estimate		81.5%	18.5%	100.0%
		Standard Error		.8%	.8%	.0%
		95% Confidence Interval	Lower	79.7%	16.9%	100.0%
			Upper	83.1%	20.3%	100.0%
3	% within Years of education-4 categories 1=0-11 2=12 3=13-15 4=16+	Estimate		78.8%	21.2%	100.0%
		Standard Error		1.0%	1.0%	.0%
		95% Confidence Interval	Lower	76.6%	19.2%	100.0%
			Upper	80.8%	23.4%	100.0%
4	% within Years of education-4 categories 1=0-11 2=12 3=13-15 4=16+	Estimate		80.3%	19.7%	100.0%
		Standard Error		1.1%	1.1%	.0%
		95% Confidence Interval	Lower	78.0%	17.6%	100.0%
			Upper	82.4%	22.0%	100.0%
Total	% within Years of education-4 categories 1=0-11 2=12 3=13-15 4=16+	Estimate		80.8%	19.2%	100.0%
		Standard Error		.6%	.6%	.0%
		95% Confidence Interval	Lower	79.5%	17.9%	100.0%
			Upper	82.1%	20.5%	100.0%

ald * mde

ald				mde		
				0	1	Total
0	% within ald	Estimate		82.3%	17.7%	100.0%
		Standard Error		.7%	.7%	.0%
		95% Confidence Interval	Lower	81.0%	16.4%	100.0%
			Upper	83.6%	19.0%	100.0%
1	% within ald	Estimate		54.8%	45.2%	100.0%
		Standard Error		2.9%	2.9%	.0%
		95% Confidence Interval	Lower	48.9%	39.4%	100.0%
			Upper	60.6%	51.1%	100.0%
Total	% within ald	Estimate		80.8%	19.2%	100.0%
		Standard Error		.6%	.6%	.0%
		95% Confidence Interval	Lower	79.5%	17.9%	100.0%
			Upper	82.1%	20.5%	100.0%

Tests of Independence

		Chi-Square	Adjusted F	df1	df2	Sig.
ag4cat * mde	Pearson	75.970	26.390	2.761	115.970	.000
	Likelihood Ratio	82.167	28.543	2.761	115.970	.000
Marital Status-3 categories * mde	Pearson	24.142	11.085	1.899	79.745	.000
	Likelihood Ratio	23.378	10.734	1.899	79.745	.000
Sex * mde	Pearson	49.117	44.834	1	42	.000
	Likelihood Ratio	49.666	45.335	1	42	.000
Years of education-4 categories 1=0-11 2=12 3=13-15 4=16+ * mde	Pearson	10.081	4.304	2.903	121.925	.007
	Likelihood Ratio	10.180	4.347	2.903	121.925	.007
ald * mde	Pearson	141.704	120.028	1	42	.000
	Likelihood Ratio	114.974	97.387	1	42	.000

The adjusted F is a variant of the second-order Rao-Scott adjusted chi-square statistic.

Significance is based on the adjusted F and its degrees of freedom.

```
* Logistic Model Estimation: Analysis Example 8.1 NCS-R Data

* Complex Samples Logistic Regression.
CSLOGISTIC  mde(LOW) BY revag4cat reved4cat revmar3cat WITH sexm ald
  /PLAN FILE='F:\applied_analysis_book\SPSS Analysis Examples Replication\Analysis Examples Replication Winter 2010 SPSSv18\ncsr_p2wt.csaplan'
  /MODEL revag4cat reved4cat revmar3cat sexm ald
  /INTERCEPT INCLUDE=YES SHOW=YES
  /STATISTICS PARAMETER EXP SE CINTERVAL TTEST
  /TEST TYPE=F PADJUST=LSD
  /MISSING CLASSMISSING=EXCLUDE
  /CRITERIA MXITER=100 MXSTEP=5 PCONVERGE=[1E-006 RELATIVE] LCONVERGE=[0] CHKSEP=20 CILEVEL=95
  /PRINT SUMMARY SAMPLEINFO.


REVERSE CODED VARIABLES ARE SIMPLY THE REVERSE OF THE ORIGINAL CODES.

NOTE: CODES FOR AG4CAT 1=18-29 2=30-44 3=45-59 4=60+ YEARS OF AGE, MDE 0=NO 1=YES, MAR3CAT 1=MARRIED 2=PREVIOUSLY MARRIED 3=NEVER MARRIED, SEX 1=MALE
2=FEMALE, ALD 0=NO 1=YES.
```

Sample Design Information

		N
Unweighted Cases	Valid	5692
	Invalid	3590
	Total	9282
Population Size		5.692E3
Stage 1	Strata	42
	Units	84
Sampling Design Degrees of Freedom		42

Pseudo R Squares

Cox and Snell	.051
Nagelkerke	.081
McFadden	.053

Dependent Variable: mde

(reference category = 0)

Model: (Intercept),

revag4cat, reved4cat,

revmar3cat, sexm, ald

Tests of Model Effects

Source	df1	df2	Wald F	Sig.
(Corrected Model)	10.000	33.000	28.070	.000
(Intercept)	1.000	42.000	937.702	.000
revag4cat	3.000	40.000	19.031	.000
reved4cat	3.000	40.000	2.130	.112
revmar3cat	2.000	41.000	16.603	.000
sexm	1.000	42.000	55.907	.000
ald	1.000	42.000	85.285	.000

Dependent Variable: mde (reference category = 0)

Model: (Intercept), revag4cat, reved4cat, revmar3cat, sexm, ald

Parameter Estimates

mde	Parameter	B	Std. Error	95% Confidence Interval		Hypothesis Test			Exp(B)	95% Confidence Interval for Exp(B)	
				Lower	Upper	t	df	Sig.		Lower	Upper
1	(Intercept)	-1.583	.121	-1.827	-1.340	-13.120	42.000	.000	.205	.161	.262
	[revag4cat=1.0000]	-.676	.141	-.961	-.391	-4.783	42.000	.000	.509	.383	.677
	[revag4cat=2.0000]	.206	.092	.022	.391	2.256	42.000	.029	1.229	1.022	1.479
	[revag4cat=3.0000]	.256	.094	.065	.446	2.708	42.000	.010	1.291	1.067	1.562
	[revag4cat=4.0000]	.000[a]	.	.	.	.	.	.	1.000	.	.
	[reved4cat=1.0000]	.163	.111	-.060	.386	1.473	42.000	.148	1.177	.941	1.471
	[reved4cat=2.0000]	.231	.093	.043	.418	2.477	42.000	.017	1.259	1.044	1.519
	[reved4cat=3.0000]	.079	.097	-.116	.275	.818	42.000	.418	1.082	.890	1.316
	[reved4cat=4.0000]	.000[a]	.	.	.	.	.	.	1.000	.	.
	[revmar3cat=1.0000]	.116	.108	-.102	.333	1.071	42.000	.290	1.123	.903	1.396
	[revmar3cat=2.0000]	.486	.085	.314	.659	5.695	42.000	.000	1.626	1.369	1.932
	[revmar3cat=3.0000]	.000[a]	.	.	.	.	.	.	1.000	.	.
	sexm	-.577	.077	-.733	-.422	-7.477	42.000	.000	.561	.480	.656
	ald	1.424	.154	1.113	1.735	9.235	42.000	.000	4.152	3.042	5.668

Dependent Variable: mde (reference category = 0)

Model: (Intercept), revag4cat, reved4cat, revmar3cat, sexm, ald

a. Set to zero because this parameter is redundant.

```
* NOTE: GOODNESS OF FIT TEST NOT AVAILABLE IN SPSS/PASW V18
* USE REVERSE CODING FOR FACTOR VARIABLES HERE TO MATCH OMITTED CATEGORY IN STATA

* Complex Samples Logistic Regression.
CSLOGISTIC  mde(LOW) BY revag4cat reved4cat revmar3cat WITH sexm ald
  /PLAN FILE='F:\applied_analysis_book\SPSS Analysis Examples Replication\Analysis Examples Replication Winter 2010 SPSSv18\ncsr_p2wt.csaplan'
  /MODEL revag4cat reved4cat revmar3cat sexm ald sexm*revag4cat sexm*reved4cat sexm*ald revmar3cat*sexm
  /INTERCEPT INCLUDE=YES SHOW=YES
  /STATISTICS PARAMETER EXP SE CINTERVAL TTEST
  /TEST TYPE=F PADJUST=LSD
  /ODDSRATIOS FACTOR=[revag4cat(HIGH)]
  /ODDSRATIOS FACTOR=[reved4cat(HIGH)]
  /ODDSRATIOS FACTOR=[revmar3cat(HIGH)]
  /ODDSRATIOS COVARIATE=[sexm(1)]
  /ODDSRATIOS COVARIATE=[ald(1)]
  /MISSING CLASSMISSING=EXCLUDE
  /CRITERIA MXITER=100 MXSTEP=5 PCONVERGE=[1E-006 RELATIVE] LCONVERGE=[0] CHKSEP=20 CILEVEL=95
  /PRINT SUMMARY SAMPLEINFO.
```

Sample Design Information

		N
Unweighted Cases	Valid	5692
	Invalid	3590
	Total	9282
Population Size		5.692E3
Stage 1	Strata	42
	Units	84
Sampling Design Degrees of Freedom		42

Pseudo R Squares

Cox and Snell	.051
Nagelkerke	.082
McFadden	.054

Dependent Variable: mde

(reference category = 0)

Model: (Intercept), revag4cat, reved4cat, revmar3cat, sexm, ald, revag4cat * sexm, reved4cat * sexm, sexm * ald, revmar3cat * sexm

Tests of Model Effects

Source	df1	df2	Wald F	Sig.
(Corrected Model)	19.000	24.000	17.150	.000
(Intercept)	1.000	42.000	959.904	.000
revag4cat	3.000	40.000	12.750	.000
reved4cat	3.000	40.000	2.253	.097
revmar3cat	2.000	41.000	7.045	.002
sexm	1.000	42.000	26.929	.000
ald	1.000	42.000	54.170	.000
revag4cat * sexm	3.000	40.000	.248	.863
reved4cat * sexm	3.000	40.000	.126	.944
sexm * ald	1.000	42.000	.684	.413
revmar3cat * sexm	2.000	41.000	.765	.472

Tests of Model Effects

Source	df1	df2	Wald F	Sig.
(Corrected Model)	19.000	24.000	17.150	.000
(Intercept)	1.000	42.000	959.904	.000
revag4cat	3.000	40.000	12.750	.000
reved4cat	3.000	40.000	2.253	.097
revmar3cat	2.000	41.000	7.045	.002
sexm	1.000	42.000	26.929	.000
ald	1.000	42.000	54.170	.000
revag4cat * sexm	3.000	40.000	.248	.863
reved4cat * sexm	3.000	40.000	.126	.944
sexm * ald	1.000	42.000	.684	.413
revmar3cat * sexm	2.000	41.000	.765	.472

Dependent Variable: mde (reference category = 0)

Model: (Intercept), revag4cat, reved4cat, revmar3cat, sexm, ald, revag4cat * sexm, reved4cat * sexm, sexm * ald, revmar3cat * sexm

Parameter Estimates

mde	Parameter	B	Std. Error	95% Confidence Interval		Hypothesis Test			Exp(B)	95% Confidence Interval for Exp(B)	
				Lower	Upper	t	df	Sig.		Lower	Upper
1	(Intercept)	-1.600	.134	-1.870	-1.329	-11.939	42.000	.000	.202	.154	.265
	[revag4cat=1.0000]	-.646	.175	-.999	-.292	-3.685	42.000	.001	.524	.368	.747
	[revag4cat=2.0000]	.215	.102	.008	.421	2.094	42.000	.042	1.239	1.008	1.524
	[revag4cat=3.0000]	.220	.114	-.009	.450	1.937	42.000	.059	1.247	.991	1.568
	[revag4cat=4.0000]	.000[a]	.	.	.	.	.	.	1.000	.	.
	[reved4cat=1.0000]	.242	.152	-.064	.549	1.595	42.000	.118	1.274	.938	1.731
	[reved4cat=2.0000]	.297	.117	.061	.534	2.540	42.000	.015	1.346	1.063	1.705
	[reved4cat=3.0000]	.131	.084	-.038	.299	1.559	42.000	.126	1.139	.962	1.349
	[reved4cat=4.0000]	.000[a]	.	.	.	.	.	.	1.000	.	.
	[revmar3cat=1.0000]	.017	.130	-.245	.279	.134	42.000	.894	1.017	.783	1.322
	[revmar3cat=2.0000]	.418	.111	.195	.641	3.780	42.000	.000	1.519	1.215	1.898
	[revmar3cat=3.0000]	.000[a]	.	.	.	.	.	.	1.000	.	.
	sexm	-.546	.357	-1.267	.174	-1.530	42.000	.134	.579	.282	1.190
	ald	1.553	.211	1.127	1.979	7.360	42.000	.000	4.726	3.087	7.236
	[revag4cat=1.0000] * sexm	-.038	.302	-.647	.572	-.125	42.000	.901	.963	.523	1.771
	[revag4cat=2.0000] * sexm	.003	.213	-.427	.432	.012	42.000	.990	1.003	.653	1.541
	[revag4cat=3.0000] * sexm	.097	.201	-.309	.502	.482	42.000	.633	1.102	.734	1.652
	[revag4cat=4.0000] * sexm	.000[a]	.	.	.	.	.	.	1.000	.	.
	[reved4cat=1.0000] * sexm	-.194	.344	-.889	.501	-.564	42.000	.576	.824	.411	1.650
	[reved4cat=2.0000] * sexm	-.169	.269	-.712	.375	-.627	42.000	.534	.845	.490	1.455
	[reved4cat=3.0000] * sexm	-.138	.271	-.685	.409	-.508	42.000	.614	.871	.504	1.506
	[reved4cat=4.0000] * sexm	.000[a]	.	.	.	.	.	.	1.000	.	.
	sexm * ald	-.200	.242	-.689	.288	-.827	42.000	.413	.818	.502	1.334
	[revmar3cat=1.0000] * sexm	.232	.212	-.196	.660	1.094	42.000	.280	1.261	.822	1.934
	[revmar3cat=2.0000] * sexm	.183	.208	-.237	.602	.878	42.000	.385	1.200	.789	1.826
	[revmar3cat=3.0000] * sexm	.000[a]	.	.	.	.	.	.	1.000	.	.

Dependent Variable: mde (reference category = 0)

Model: (Intercept), revag4cat, reved4cat, revmar3cat, sexm, ald, revag4cat * sexm, reved4cat * sexm, sexm * ald, revmar3cat * sexm

a. Set to zero because this parameter is redundant.

```
* NOTE THAT LOGIT, PROBIT, AND CLOGLOG ARE AVAILABLE IN THE CSORDINAL COMMAND OF THE COMPLEX SAMPLES MODULE.

*ANALYSIS EXAMPLE USING LOGIT LINK:

* Complex Samples Ordinal Regression.
CSORDINAL  ald (ASCENDING) BY revag4cat reved4cat revmar3cat WITH sexm
  /PLAN FILE='F:\applied_analysis_book\SPSS Analysis Examples Replication\Analysis Examples Replication Winter 2010 SPSSv18\ncsr_p2wt.csaplan'
  /LINK FUNCTION=LOGIT
  /MODEL revag4cat reved4cat revmar3cat sexm
  /STATISTICS PARAMETER SE CINTERVAL TTEST
  /TEST TYPE=F PADJUST=LSD
  /MISSING CLASSMISSING=EXCLUDE
  /CRITERIA MXITER=100 MXSTEP=5 PCONVERGE=[1e-006 RELATIVE] LCONVERGE=[0] METHOD=NEWTON CHKSEP=20 CILEVEL=95
  /PRINT SUMMARY SAMPLEINFO.
```

Sample Design Information

		N
Unweighted Cases	Valid	5692
	Invalid	3590
	Total	9282
Population Size		5.692E3
Stage 1	Strata	42
	Units	84
Sampling Design Degrees of Freedom		42

Pseudo R Squares

Cox and Snell	.022
Nagelkerke	.063
McFadden	.052

Dependent Variable: ald
(Ascending)
Model: (Threshold),
revag4cat, reved4cat,
revmar3cat, sexm
Link function: Logit

Tests of Model Effects

Source	df1	df2	Wald F	Sig.
revag4cat	3.000	40.000	12.058	.000
reved4cat	3.000	40.000	4.797	.006
revmar3cat	2.000	41.000	6.537	.003
sexm	1.000	42.000	70.210	.000

Dependent Variable: ald (Ascending)
Model: (Threshold), revag4cat, reved4cat, revmar3cat,
sexm
Link function: Logit

Parameter Estimates

Parameter		B	Std. Error	95% Confidence Interval		Hypothesis Test		
				Lower	Upper	t	df	Sig.
Threshold	[ald=0]	3.124	.225	2.670	3.579	13.869	42.000	.000
Regression	[revag4cat=1.0000]	-1.120	.212	-1.549	-.692	-5.273	42.000	.000
	[revag4cat=2.0000]	-.051	.144	-.341	.240	-.352	42.000	.726
	[revag4cat=3.0000]	.146	.178	-.213	.506	.821	42.000	.416
	[revag4cat=4.0000]	.000[a]	.	.	.	.	.	.
	[reved4cat=1.0000]	-.736	.197	-1.134	-.338	-3.734	42.000	.001
	[reved4cat=2.0000]	-.264	.176	-.620	.091	-1.502	42.000	.141
	[reved4cat=3.0000]	-.268	.194	-.659	.123	-1.386	42.000	.173
	[reved4cat=4.0000]	.000[a]	.	.	.	.	.	.
	[revmar3cat=1.0000]	.065	.169	-.275	.406	.387	42.000	.701
	[revmar3cat=2.0000]	.518	.142	.231	.805	3.645	42.000	.001
	[revmar3cat=3.0000]	.000[a]	.	.	.	.	.	.
	sexm	.998	.119	.758	1.238	8.379	42.000	.000

Dependent Variable: ald (Ascending)

Model: (Threshold), revag4cat, reved4cat, revmar3cat, sexm

Link function: Logit

a. Set to zero because this parameter is redundant.

```
*ANALYSIS EXAMPLE USING PROBIT LINK

* Complex Samples Ordinal Regression.
CSORDINAL  ald (ASCENDING) BY revag4cat reved4cat revmar3cat WITH sexm
  /PLAN FILE='F:\applied_analysis_book\SPSS Analysis Examples Replication\Analysis Examples Replication Winter 2010 SPSSv18\ncsr_p2wt.csaplan'
  /LINK FUNCTION=PROBIT
  /MODEL revag4cat reved4cat revmar3cat sexm
  /STATISTICS PARAMETER SE CINTERVAL TTEST
  /TEST TYPE=F PADJUST=LSD
  /MISSING CLASSMISSING=EXCLUDE
  /CRITERIA MXITER=100 MXSTEP=5 PCONVERGE=[1e-006 RELATIVE] LCONVERGE=[0] METHOD=NEWTON CHKSEP=20 CILEVEL=95
  /PRINT SUMMARY SAMPLEINFO.
```

Sample Design Information

		N
Unweighted Cases	Valid	5692
	Invalid	3590
	Total	9282
Population Size		5.692E3
Stage 1	Strata	42
	Units	84
Sampling Design Degrees of Freedom		42

Pseudo R Squares

Cox and Snell	.022
Nagelkerke	.064
McFadden	.053

Dependent Variable: ald

(Ascending)

Model: (Threshold),

revag4cat, reved4cat,

revmar3cat, sexm

Link function: Probit

Tests of Model Effects

Source	df1	df2	Wald F	Sig.
revag4cat	3.000	40.000	15.256	.000
reved4cat	3.000	40.000	4.787	.006
revmar3cat	2.000	41.000	6.660	.003
sexm	1.000	42.000	69.832	.000

Dependent Variable: ald (Ascending)

Model: (Threshold), revag4cat, reved4cat, revmar3cat,

sexm

Link function: Probit

Parameter Estimates

Parameter		B	Std. Error	95% Confidence Interval		Hypothesis Test		
				Lower	Upper	t	df	Sig.
Threshold	[ald=0]	1.719	.105	1.507	1.932	16.320	42.000	.000
Regression	[revag4cat=1.0000]	-.531	.093	-.720	-.343	-5.694	42.000	.000
	[revag4cat=2.0000]	-.034	.067	-.170	.101	-.515	42.000	.609
	[revag4cat=3.0000]	.065	.085	-.105	.236	.772	42.000	.444
	[revag4cat=4.0000]	.000[a]	.	.	.	.	.	.
	[reved4cat=1.0000]	-.340	.092	-.526	-.153	-3.672	42.000	.001
	[reved4cat=2.0000]	-.124	.085	-.296	.047	-1.461	42.000	.152
	[reved4cat=3.0000]	-.124	.095	-.316	.068	-1.302	42.000	.200
	[reved4cat=4.0000]	.000[a]	.	.	.	.	.	.
	[revmar3cat=1.0000]	.039	.077	-.117	.194	.506	42.000	.616
	[revmar3cat=2.0000]	.255	.070	.114	.396	3.652	42.000	.001
	[revmar3cat=3.0000]	.000[a]	.	.	.	.	.	.
	sexm	.471	.056	.357	.585	8.357	42.000	.000

Dependent Variable: ald (Ascending)

Model: (Threshold), revag4cat, reved4cat, revmar3cat, sexm

Link function: Probit

a. Set to zero because this parameter is redundant.

```
*ANALYSIS EXAMPLE USING CLOGLOG LINK

* Complex Samples Ordinal Regression.
CSORDINAL  ald (DESCENDING) BY revag4cat reved4cat revmar3cat WITH sexm
  /PLAN FILE='F:\applied_analysis_book\SPSS Analysis Examples Replication\Analysis Examples Replication Winter 2010 SPSSv18\ncsr_p2wt.csaplan'
  /LINK FUNCTION=CLOGLOG
  /MODEL revag4cat reved4cat revmar3cat sexm
  /STATISTICS PARAMETER SE CINTERVAL TTEST
  /TEST TYPE=F PADJUST=LSD
  /MISSING CLASSMISSING=EXCLUDE
  /CRITERIA MXITER=100 MXSTEP=5 PCONVERGE=[1e-006 RELATIVE] LCONVERGE=[0] METHOD=NEWTON CHKSEP=20 CILEVEL=95
  /PRINT SUMMARY SAMPLEINFO.
```

Sample Design Information

		N
Unweighted Cases	Valid	5692
	Invalid	3590
	Total	9282
Population Size		5.692E3
Stage 1	Strata	42
	Units	84
Sampling Design Degrees of Freedom		42

Pseudo R Squares

Cox and Snell	.022
Nagelkerke	.063
McFadden	.052

Dependent Variable: ald

(Descending)

Model: (Threshold),

revag4cat, reved4cat,

revmar3cat, sexm

Link function:

Complementary log-log

Tests of Model Effects

Source	df1	df2	Wald F	Sig.
revag4cat	3.000	40.000	11.515	.000
reved4cat	3.000	40.000	4.771	.006
revmar3cat	2.000	41.000	6.500	.004
sexm	1.000	42.000	70.326	.000

Dependent Variable: ald (Descending)

Model: (Threshold), revag4cat, reved4cat, revmar3cat,

sexm

Link function: Complementary log-log

Parameter Estimates

Parameter		B	Std. Error	95% Confidence Interval		Hypothesis Test		
				Lower	Upper	t	df	Sig.
Threshold	[ald=1]	-3.148	.218	-3.588	-2.709	-14.469	42.000	.000
Regression	[revag4cat=1.0000]	1.083	.209	.662	1.504	5.191	42.000	.000
	[revag4cat=2.0000]	.045	.140	-.237	.327	.324	42.000	.748
	[revag4cat=3.0000]	-.143	.171	-.488	.202	-.836	42.000	.408
	[revag4cat=4.0000]	.000[a]	.	.	.	.	.	.
	[reved4cat=1.0000]	.713	.190	.328	1.097	3.741	42.000	.001
	[reved4cat=2.0000]	.256	.169	-.085	.596	1.516	42.000	.137
	[reved4cat=3.0000]	.260	.185	-.113	.633	1.406	42.000	.167
	[reved4cat=4.0000]	.000[a]	.	.	.	.	.	.
	[revmar3cat=1.0000]	-.060	.164	-.391	.270	-.370	42.000	.713
	[revmar3cat=2.0000]	-.494	.136	-.767	-.220	-3.638	42.000	.001
	[revmar3cat=3.0000]	.000[a]	.	.	.	.	.	.
	sexm	-.965	.115	-1.198	-.733	-8.386	42.000	.000

Dependent Variable: ald (Descending)

Model: (Threshold), revag4cat, reved4cat, revmar3cat, sexm

Link function: Complementary log-log

a. Set to zero because this parameter is redundant.