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* SAS Analysis Examples Replication for ASDA 3rd Edition
* Berglund Winter 2025
* Chapter 8 ;

libname ncsr "P:\ASDA3\Data Sets for Analysis Examples and Stata R Code" ;
data c8_ncsr ;
 set ncsr.ncsr ;
run ;

proc format ;
 value af 1='18-29' 2='30-44' 3='45-59' 4='60+' ;
 value sf 1='M' 2='F' ;
 value edf 1='0-11' 2='12' 3='13-15' 4='16+' ;
 value mf 1='Currently Married' 2='Previously Married' 3='Never Married' ;
 value yn 1='Yes' 0='No' ;
run ;
* close rtf file if open ;
ods rtf close ;
ods rtf style=minimal bodytitle ;
options nocenter nodate nonumber ps=69 ls=118 ;
title "Section 8.7: Analysis Application: Examining Predictors of a Lifetime Major Depressive Episode in the NCS-R
Data, Numbers for Table 8.5  " ;
proc surveyfreq data=c8_ncsr;
 strata sestrat ; cluster seclustr ; weight ncsrwtlg ;
 tables (ag4cat sex ald ed4cat mar3cat)*mde /row chisq(secondorder) ;
 format ag4cat af. sex sf. ed4cat edf. mar3cat mf.  mde yn. ;
run ;

title "Numbers for Table 8.6, 8.7, 8.8" ;
proc surveylogistic data=c8_ncsr ;
 strata sestrat ; cluster seclustr ; weight ncsrwtlg ;
 class ag4cat (ref=first) sex (ref=last) ed4cat (ref=first) mar3cat (ref=first) / param=ref ;
 model mde (event='Yes') =ag4cat sex ald ed4cat mar3cat ;
 format ag4cat af. sex sf. ed4cat edf. mar3cat mf. mde yn.;
 ods output parameterestimates=logparms ;
 output out=predicted p=p ;
run ;

* Note: Average Marginal Effects Plots not directly available from SURVEYLOGISTIC, see
https://support.sas.com/kb/22/604.html for information on calculating marginal effects manually;
proc logistic data=c8_ncsr ;
 weight ncsrwtlg ;
 class ag4cat (ref=first) sex (ref=last) ed4cat (ref=first) mar3cat (ref=first) ald (ref=first) / param=ref ;
 model mde (event='1') =ag4cat sex ald ed4cat mar3cat ;
run ;

ods text ="Margins Plot and GOF test not directly available in SAS, see https://support.sas.com/kb/22/604.html for
information on manual calculation of marginal effects" ;

title "Numbers for Table 8.9 and 8.10 Interaction Testing for Preliminary Model Predicting MDE Outcome " ;
proc surveylogistic data=c8_ncsr ;
 strata sestrat ; cluster seclustr ; weight ncsrwtlg ;
 class ag4cat (ref=first) sex (ref=last) ed4cat (ref=first) mar3cat (ref=first) / param=ref ;
 model mde (event='Yes') =ag4cat sex ald ed4cat mar3cat ag4cat*sex ald*sex ed4cat*sex mar3cat*sex ;
 * note the numbers from the estimate statement are in the regular output but shown again as an example ;
 estimate 'Age X Sex' ag4cat*sex 1 0 0, ag4cat*sex 0 1 0 , ag4cat*sex 0 0 1  / joint;
 estimate 'ald X Sex' ald*sex 1/ joint ;
 estimate 'Education X Sex' ed4cat*sex 1 0 0, ed4cat*sex 0 1 0, ed4cat*sex 0 0 1 / joint ;
 estimate 'Marital Status X Sex' mar3cat*sex 1 0 , mar3cat*sex 0 1 /joint ;
 format ag4cat af. sex sf. ed4cat edf. mar3cat mf. mde yn.;
run ;

* Test need for Weighted Estimation using SAS "estimate" statement for custom contrasts ;
proc surveylogistic data=c8_ncsr ;
 strata sestrat ; cluster seclustr ; *weight ncsrwtlg ;
 class ag4cat (ref=first) sex (ref=last) ed4cat (ref=first) mar3cat (ref=first) / param=ref ;
 model mde (event='Yes') =ag4cat sex ald ed4cat mar3cat ncsrwtlg
        ncsrwtlg*ag4cat ncsrwtlg*sex ncsrwtlg*ald ncsrwtlg*ed4cat  ncsrwtlg*mar3cat ;
estimate 'Weight and Weight Interactions'
        ncsrwtlg 1,
        ncsrwtlg*ag4cat 1 0 0 , ag4cat*ncsrwtlg  0 1 0 , ag4cat*ncsrwtlg 0 0 1 ,
        sex*ncsrwtlg 1 ,
        ald*ncsrwtlg 1 ,
        ed4cat*ncsrwtlg 1 0 0 , ed4cat*ncsrwtlg  0 1 0 , ed4cat*ncsrwtlg 0 0 1,
        mar3cat*ncsrwtlg 1 0 , mar3cat*ncsrwtlg  0 1 / joint  ;
format ag4cat af. sex sf. ed4cat edf. mar3cat mf. mde yn.;
run ;

* NOTE: Bayesian Approach for Design Based Logistic/Probit/CLogLog not available in SAS ;
```

```
title "Numbers for Table 8.12" ;
title2 "Logistic Regression" ;
proc surveylogistic data=c8_ncsr ;
 strata sestrat ; cluster seclustr ; weight ncsrwtlg ;
 class ag4cat (ref=first) sex (ref=last) ed4cat (ref=first) mar3cat (ref=first) / param=ref ;
 model ald (event='Yes') =ag4cat sex ed4cat mar3cat ;
 format ag4cat af. sex sf. ed4cat edf. mar3cat mf. ald yn. ;
run ;
title2 "Probit Regression" ;
proc surveylogistic data=c8_ncsr ;
 strata sestrat ; cluster seclustr ; weight ncsrwtlg ;
 class ag4cat (ref=first) sex (ref=last) ed4cat (ref=first) mar3cat (ref=first) / param=ref ;
 model ald (event='Yes') =ag4cat sex ed4cat mar3cat / link=probit ;
 format ag4cat af. sex sf. ed4cat edf. mar3cat mf. ald yn. ;
run ;
title2 "CLOGLOG Regression" ;
proc surveylogistic data=c8_ncsr ;
 strata sestrat ; cluster seclustr ; weight ncsrwtlg ;
 class ag4cat (ref=first) sex (ref=last) ed4cat (ref=first) mar3cat (ref=first) / param=ref ;
 model ald (event='Yes') =ag4cat sex ed4cat mar3cat / link=cloglog ;
 format ag4cat af. sex sf. ed4cat edf. mar3cat mf. ald yn.;
run ;

ods rtf close ;
```

Section 8.7: Analysis Application: Examining Predictors of a Lifetime Major Depressive Episode in the NCS-R Data, Numbers for Table 8.5

The SURVEYFREQ Procedure

Data Summary	
Number of Strata	42
Number of Clusters	84
Number of Observations	9282
Number of Observations Used	5692
Number of Obs with Nonpositive Weights	3590
Sum of Weights	5692.00048

Table of ag4cat by mde								
ag4cat	mde	Frequency	Weighted Frequency	Std Err of Wgt Freq	Percent	Std Err of Percent	Row Percent	Std Err of Row Percent
18-29	No	974	1091	76.02329	19.1743	0.9132	81.6012	0.8854
	Yes	397	246.08116	21.73234	4.3233	0.3073	18.3988	0.8854
	Total	1371	1337	93.35782	23.4976	1.1167	100.0000	
30-44	No	1176	1267	64.54216	22.2561	0.8483	77.1234	1.1045
	Yes	650	375.76746	22.57099	6.6017	0.3006	22.8766	1.1045
	Total	1826	1643	75.91359	28.8578	0.8673	100.0000	
45-59	No	997	1169	77.92918	20.5443	0.9923	77.6673	1.2607
	Yes	524	336.24696	29.16619	5.9074	0.3410	22.3327	1.2607
	Total	1521	1506	97.73017	26.4516	1.0712	100.0000	
60+	No	749	1073	68.78690	18.8488	1.0286	88.9391	0.9563
	Yes	225	133.42778	12.10988	2.3441	0.1614	11.0609	0.9563
	Total	974	1206	72.75483	21.1930	1.0038	100.0000	
Total	No	3896	4600	194.66294	80.8236	0.6407		
	Yes	1796	1092	68.88569	19.1764	0.6407		
	Total	5692	5692	251.09560	100.0000			

Rao-Scott Chi-Square Test	
Pearson Chi-Square	75.9697
Design Correction	0.9991
First-Order Chi-Square	76.0359
Second-Order Chi-Square	68.6275
DF	2.71
Pr > ChiSq	<.0001
F Value	25.3453
Num DF	2.71
Den DF	113.72
Pr > F	<.0001
Sample Size = 5692	

Table of sex by mde

sex	mde	Frequency	Weighted Frequency	Std Err of Wgt Freq	Percent	Std Err of Percent	Row Percent	Std Err of Row Percent
M	No	1779	2264	100.28695	39.7741	1.1391	84.7107	0.9138
	Yes	603	408.61423	33.68576	7.1787	0.3731	15.2893	0.9138
	Total	2382	2673	121.20178	46.9529	1.0105	100.0000	
F	No	2117	2337	123.28903	41.0494	0.9079	77.3830	0.6728
	Yes	1193	682.90913	38.66449	11.9977	0.3932	22.6170	0.6728
	Total	3310	3019	154.57970	53.0471	1.0105	100.0000	
Total	No	3896	4600	194.66294	80.8236	0.6407		
	Yes	1796	1092	68.88569	19.1764	0.6407		
	Total	5692	5692	251.09560	100.0000			

Rao-Scott Chi-Square Test	
Pearson Chi-Square	49.1166
Design Correction	0.9446
First-Order Chi-Square	51.9947
Second-Order Chi-Square	51.9947
DF	1
Pr > ChiSq	<.0001
F Value	51.9947
Num DF	1
Den DF	42
Pr > F	<.0001
Sample Size = 5692	

Table of ald by mde

ald	mde	Frequency	Weighted Frequency	Std Err of Wgt Freq	Percent	Std Err of Percent	Row Percent	Std Err of Row Percent
0	No	3664	4432	183.07460	77.8586	0.7366	82.3086	0.6507
	Yes	1585	952.55085	63.26164	16.7349	0.6019	17.6914	0.6507
	Total	5249	5384	234.33376	94.5935	0.3248	100.0000	
1	No	232	168.76731	19.21233	2.9650	0.2706	54.8409	2.9025
	Yes	211	138.97251	11.25575	2.4415	0.1796	45.1591	2.9025
	Total	443	307.73983	25.12875	5.4065	0.3248	100.0000	
Total	No	3896	4600	194.66294	80.8236	0.6407		
	Yes	1796	1092	68.88569	19.1764	0.6407		
	Total	5692	5692	251.09560	100.0000			

Rao-Scott Chi-Square Test	
Pearson Chi-Square	141.7044
Design Correction	1.5832
First-Order Chi-Square	89.5042
Second-Order Chi-Square	89.5042
DF	1
Pr > ChiSq	<.0001
F Value	89.5042
Num DF	1
Den DF	42
Pr > F	<.0001
Sample Size = 5692	

Table of ED4CAT by mde								
ED4CAT	mde	Frequency	Weighted Frequency	Std Err of Wgt Freq	Percent	Std Err of Percent	Row Percent	Std Err of Row Percent
0-11	No	613	798.37379	51.04296	14.0262	0.8281	83.6916	1.2121
	Yes	236	155.57319	14.85368	2.7332	0.1917	16.3084	1.2121
	Total	849	953.94698	59.04526	16.7594	0.8617	100.0000	
12	No	1177	1508	92.13927	26.4916	0.9349	81.4503	0.8272
	Yes	535	343.41297	24.89564	6.0333	0.3480	18.5497	0.8272
	Total	1712	1851	110.50869	32.5249	1.1167	100.0000	
13-15	No	1139	1235	66.33923	21.6922	0.7670	78.7515	1.0439
	Yes	570	333.14937	22.24957	5.8529	0.2640	21.2485	1.0439
	Total	1709	1568	79.48027	27.5452	0.7622	100.0000	
16+	No	967	1059	65.88639	18.6135	0.8864	80.3325	1.0876
	Yes	455	259.38783	24.27390	4.5571	0.3183	19.6675	1.0876
	Total	1422	1319	84.24656	23.1706	1.0446	100.0000	
Total	No	3896	4600	194.66294	80.8236	0.6407		
	Yes	1796	1092	68.88569	19.1764	0.6407		
	Total	5692	5692	251.09560	100.0000			

Rao-Scott Chi-Square Test	
Pearson Chi-Square	10.0806
Design Correction	0.7930
First-Order Chi-Square	12.7124
Second-Order Chi-Square	12.2631
DF	2.89
Pr > ChiSq	0.0059

Rao-Scott Chi-Square Test	
F Value	4.2375
Num DF	2.89
Den DF	121.55
Pr > F	0.0076
Sample Size = 5692	

Table of MAR3CAT by mde								
MAR3CAT	mde	Frequency	Weighted Frequency	Std Err of Wgt Freq	Percent	Std Err of Percent	Row Percent	Std Err of Row Percent
Currently Married	No	2316	2633	129.78766	46.2527	1.1889	82.6738	0.7420
	Yes	920	551.74202	41.57012	9.6933	0.4206	17.3262	0.7420
	Total	3236	3184	162.63940	55.9460	1.2360	100.0000	
Previously Married	No	750	901.32010	51.92644	15.8349	0.7256	76.0979	1.4494
	Yes	489	283.10112	19.65880	4.9737	0.2597	23.9021	1.4494
	Total	1239	1184	59.49737	20.8085	0.6883	100.0000	
Never Married	No	830	1066	75.59104	18.7360	1.0212	80.6006	1.1549
	Yes	387	256.68022	20.56723	4.5095	0.3091	19.3994	1.1549
	Total	1217	1323	88.18366	23.2455	1.1512	100.0000	
Total	No	3896	4600	194.66294	80.8236	0.6407		
	Yes	1796	1092	68.88569	19.1764	0.6407		
	Total	5692	5692	251.09560	100.0000			

Rao-Scott Chi-Square Test	
Pearson Chi-Square	24.1420
Design Correction	1.1185
First-Order Chi-Square	21.5840
Second-Order Chi-Square	20.7763
DF	1.93
Pr > ChiSq	<.0001
F Value	10.7920
Num DF	1.93
Den DF	80.86
Pr > F	<.0001
Sample Size = 5692	

Numbers for Table 8.6, 8.7, 8.8

The SURVEYLOGISTIC Procedure

Model Information		
Data Set	WORK.C8_NCSR	
Response Variable	mde	Major Depressive Episode 1=Yes 0=No
Number of Response Levels	2	
Stratum Variable	sestrat	SAMPLING ERROR STRATUM
Number of Strata	42	
Cluster Variable	seclustr	SAMPLING ERROR CLUSTER
Number of Clusters	84	
Weight Variable	ncsrwtlg	NCSR sample part 2 weight
Model	Binary Logit	
Optimization Technique	Fisher's Scoring	
Variance Adjustment	Degrees of Freedom (DF)	

Variance Estimation	
Method	Taylor Series
Variance Adjustment	Degrees of Freedom (DF)

Number of Observations Read	9282
Number of Observations Used	5692
Sum of Weights Read	5692
Sum of Weights Used	5692

Response Profile			
Ordered Value	mde	Total Frequency	Total Weight
1	No	3896	4600.4771
2	Yes	1796	1091.5234

Probability modeled is mde='Yes'.

3590 observations having nonpositive frequencies or weights were excluded since they do not contribute to the analysis.

Class Level Information				
Class	Value	Design Variables		
ag4cat	18-29	0	0	0
	30-44	1	0	0
	45-59	0	1	0
	60+	0	0	1
sex	F	1		
	M	0		
ED4CAT	0-11	0	0	0
	12	1	0	0
	13-15	0	1	0
	16+	0	0	1
MAR3CAT	Currently Married	0	0	
	Never Married	1	0	
	Previously Married	0	1	

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	5566.174	5290.526
SC	5572.820	5363.641
-2 Log L	5564.174	5268.526

Testing Global Null Hypothesis: BETA=0				
Test	F Value	Num DF	Den DF	Pr > F
Likelihood Ratio	30.51	6.5856	276.60	<.0001
Score	26.28	10	33	<.0001
Wald	28.02	10	33	<.0001
NOTE: Second-order Rao-Scott design correction 0.5185 applied to the Likelihood Ratio test.				

Type 3 Analysis of Effects				
Effect	F Value	Num DF	Den DF	Pr > F
ag4cat	19.00	3	40	<.0001
sex	55.81	1	42	<.0001
ald	85.14	1	42	<.0001
ED4CAT	2.13	3	40	0.1121
MAR3CAT	16.57	2	41	<.0001

Analysis of Maximum Likelihood Estimates					
Parameter		Estimate	Standard Error	t Value	Pr > |t|
Intercept		-2.1604	0.1523	-14.19	<.0001
ag4cat	30-44	0.2556	0.0945	2.71	0.0098
ag4cat	45-59	0.2064	0.0916	2.25	0.0295
ag4cat	60+	-0.6757	0.1414	-4.78	<.0001
sex	F	0.5773	0.0773	7.47	<.0001
ald		1.4237	0.1543	9.23	<.0001
ED4CAT	12	0.0792	0.0970	0.82	0.4184
ED4CAT	13-15	0.2305	0.0932	2.47	0.0175
ED4CAT	16+	0.1629	0.1107	1.47	0.1486
MAR3CAT	Never Married	0.1156	0.1080	1.07	0.2905
MAR3CAT	Previously Married	0.4864	0.0855	5.69	<.0001
NOTE: The degrees of freedom for the t tests is 42.					

Odds Ratio Estimates			
Effect	Point Estimate	95% Confidence Limits	
ag4cat 30-44 vs 18-29	1.291	1.067	1.562
ag4cat 45-59 vs 18-29	1.229	1.022	1.479
ag4cat 60+ vs 18-29	0.509	0.382	0.677
sex F vs M	1.781	1.524	2.082
ald	4.152	3.041	5.669
ED4CAT 12 vs 0-11	1.082	0.890	1.316
ED4CAT 13-15 vs 0-11	1.259	1.043	1.520
ED4CAT 16+ vs 0-11	1.177	0.941	1.472
MAR3CAT Never Married vs Currently Married	1.123	0.903	1.396
MAR3CAT Previously Married vs Currently Married	1.626	1.369	1.933
NOTE: The degrees of freedom in computing the confidence limits is 42.			

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	61.5	Somers' D	0.247
Percent Discordant	36.8	Gamma	0.252
Percent Tied	1.7	Tau-a	0.107
Pairs	6997216	c	0.624

Numbers for Table 8.6, 8.7, 8.8

The LOGISTIC Procedure

Model Information		
Data Set	WORK.C8_NCSR	
Response Variable	mde	Major Depressive Episode 1=Yes 0=No
Number of Response Levels	2	
Weight Variable	ncsrwtlg	NCSR sample part 2 weight
Model	binary logit	
Optimization Technique	Fisher's scoring	

Number of Observations Read	9282
Number of Observations Used	5692
Sum of Weights Read	5692
Sum of Weights Used	5692

Response Profile			
Ordered Value	mde	Total Frequency	Total Weight
1	0	3896	4600.4771
2	1	1796	1091.5234

Probability modeled is mde=1.

3590 observations having nonpositive frequencies or weights were excluded since they do not contribute to the analysis.

Class Level Information				
Class	Value	Design Variables		
ag4cat	1	0	0	0
	2	1	0	0
	3	0	1	0
	4	0	0	1
sex	1	1		
	2	0		
ED4CAT	1	0	0	0
	2	1	0	0
	3	0	1	0
	4	0	0	1
MAR3CAT	1	0	0	
	2	1	0	
	3	0	1	
ald	0	0		
	1	1		

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	5566.174	5290.526
SC	5572.820	5363.641
-2 Log L	5564.174	5268.526

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	295.6471	10	<.0001
Score	307.6436	10	<.0001
Wald	274.3276	10	<.0001

Type 3 Analysis of Effects			
Effect	DF	Wald Chi-Square	Pr > ChiSq
ag4cat	3	73.3677	<.0001
sex	1	62.7655	<.0001
ald	1	129.0939	<.0001
ED4CAT	3	5.2748	0.1527
MAR3CAT	2	29.9107	<.0001

Analysis of Maximum Likelihood Estimates						
Parameter		DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept		1	-1.5831	0.1364	134.6144	<.0001
ag4cat	2	1	0.2556	0.1075	5.6513	0.0174
ag4cat	3	1	0.2064	0.1140	3.2813	0.0701
ag4cat	4	1	-0.6757	0.1388	23.6976	<.0001
sex	1	1	-0.5773	0.0729	62.7655	<.0001
ald	1	1	1.4237	0.1253	129.0939	<.0001
ED4CAT	2	1	0.0792	0.1101	0.5180	0.4717
ED4CAT	3	1	0.2305	0.1122	4.2212	0.0399
ED4CAT	4	1	0.1629	0.1177	1.9161	0.1663
MAR3CAT	2	1	0.4864	0.0889	29.9059	<.0001
MAR3CAT	3	1	0.1156	0.1018	1.2891	0.2562

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
ag4cat 2 vs 1	1.291	1.046	1.594
ag4cat 3 vs 1	1.229	0.983	1.537
ag4cat 4 vs 1	0.509	0.388	0.668
sex 1 vs 2	0.561	0.487	0.648
ald 1 vs 0	4.152	3.248	5.308
ED4CAT 2 vs 1	1.082	0.872	1.343
ED4CAT 3 vs 1	1.259	1.011	1.569
ED4CAT 4 vs 1	1.177	0.934	1.482
MAR3CAT 2 vs 1	1.626	1.366	1.936
MAR3CAT 3 vs 1	1.123	0.919	1.370

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	61.6	Somers' D	0.247
Percent Discordant	36.9	Gamma	0.251
Percent Tied	1.5	Tau-a	0.107
Pairs	6997216	c	0.623

Margins Plot and GOF test not directly available in SAS, see https://support.sas.com/kb/22/604.html for information on manual calculation of marginal effects

Numbers for Table 8.9 and 8.10 Interaction Testing for Preliminary Model Predicting MDE Outcome

The SURVEYLOGISTIC Procedure

Model Information		
Data Set	WORK.C8_NCSR	
Response Variable	mde	Major Depressive Episode 1=Yes 0=No
Number of Response Levels	2	
Stratum Variable	sestrat	SAMPLING ERROR STRATUM
Number of Strata	42	
Cluster Variable	seclustr	SAMPLING ERROR CLUSTER
Number of Clusters	84	
Weight Variable	ncsrwtlg	NCSR sample part 2 weight
Model	Binary Logit	
Optimization Technique	Fisher's Scoring	
Variance Adjustment	Degrees of Freedom (DF)	

Variance Estimation	
Method	Taylor Series
Variance Adjustment	Degrees of Freedom (DF)

Number of Observations Read	9282
Number of Observations Used	5692
Sum of Weights Read	5692
Sum of Weights Used	5692

Response Profile			
Ordered Value	mde	Total Frequency	Total Weight
1	No	3896	4600.4771
2	Yes	1796	1091.5234

Probability modeled is mde='Yes'.

3590 observations having nonpositive frequencies or weights were excluded since they do not contribute to the analysis.

Class Level Information				
Class	Value	Design Variables		
ag4cat	18-29	0	0	0
	30-44	1	0	0
	45-59	0	1	0
	60+	0	0	1
sex	F	1		
	M	0		
ED4CAT	0-11	0	0	0
	12	1	0	0

Class Level Information				
Class	Value	Design Variables		
	13-15	0	1	0
	16+	0	0	1
MAR3CAT	Currently Married	0	0	
	Never Married	1	0	
	Previously Married	0	1	

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	5566.174	5304.858
SC	5572.820	5437.794
-2 Log L	5564.174	5264.858

Testing Global Null Hypothesis: BETA=0				
Test	F Value	Num DF	Den DF	Pr > F
Likelihood Ratio	15.56	8.7445	367.27	<.0001
Score	13.98	19	24	<.0001
Wald	17.09	19	24	<.0001
NOTE: Second-order Rao-Scott design correction 1.1728 applied to the Likelihood Ratio test.				

Joint Tests				
Effect	F Value	Num DF	Den DF	Pr > F
ag4cat	9.31	3	40	<.0001
sex	2.33	1	42	0.1342
ald	52.64	1	42	<.0001
ED4CAT	0.34	3	40	0.7932
MAR3CAT	6.67	2	41	0.0031
ag4cat*sex	0.25	3	40	0.8631
ald*sex	0.68	1	42	0.4135
sex*ED4CAT	0.13	3	40	0.9447
sex*MAR3CAT	0.76	2	41	0.4730

Under full-rank parameterizations, Type 3 effect tests are replaced by joint tests. The joint test for an effect is a test that all the parameters associated with that effect are zero. Such joint tests might not be equivalent to Type 3 effect tests under GLM parameterization.

Analysis of Maximum Likelihood Estimates						
Parameter			Estimate	Standard Error	t Value	Pr > |t|
Intercept			-2.1463	0.2974	-7.22	<.0001
ag4cat	30-44		0.3171	0.1681	1.89	0.0661
ag4cat	45-59		0.2173	0.1836	1.18	0.2434
ag4cat	60+		-0.6834	0.2436	-2.80	0.0076
sex	F		0.5464	0.3578	1.53	0.1342
ald			1.3527	0.1864	7.26	<.0001
ED4CAT	12		-0.00726	0.2334	-0.03	0.9753
ED4CAT	13-15		0.1285	0.2074	0.62	0.5388
ED4CAT	16+		0.0482	0.2566	0.19	0.8519
MAR3CAT	Never Married		0.2492	0.1782	1.40	0.1694
MAR3CAT	Previously Married		0.6003	0.1633	3.68	0.0007
ag4cat*sex	30-44	F	-0.0967	0.2012	-0.48	0.6331
ag4cat*sex	45-59	F	-0.00264	0.2132	-0.01	0.9902
ag4cat*sex	60+	F	0.0378	0.3025	0.12	0.9011
ald*sex	F		0.2004	0.2427	0.83	0.4135
sex*ED4CAT	F	12	0.1378	0.2715	0.51	0.6144
sex*ED4CAT	F	13-15	0.1688	0.2698	0.63	0.5349
sex*ED4CAT	F	16+	0.1940	0.3447	0.56	0.5766
sex*MAR3CAT	F	Never Married	-0.2319	0.2123	-1.09	0.2810
sex*MAR3CAT	F	Previously Married	-0.1825	0.2082	-0.88	0.3858
NOTE: The degrees of freedom for the t tests is 42.						

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	61.4	Somers' D	0.250
Percent Discordant	36.4	Gamma	0.256
Percent Tied	2.2	Tau-a	0.108
Pairs	6997216	c	0.625

Estimates					
Label	Estimate	Standard Error	DF	t Value	Pr > |t|
Age X Sex	-0.09674	0.2012	42	-0.48	0.6331
Row 2	-0.00264	0.2132	42	-0.01	0.9902
Row 3	0.03781	0.3025	42	0.12	0.9011

F Test for Estimates				
Label	Num DF	Den DF	F Value	Pr > F
Age X Sex	3	40	0.25	0.8631

Estimate					
Label	Estimate	Standard Error	DF	t Value	Pr > |t|
ald X Sex	0.2004	0.2427	42	0.83	0.4135

F Test for Estimate				
Label	Num DF	Den DF	F Value	Pr > F
ald X Sex	1	42	0.68	0.4135

Estimates					
Label	Estimate	Standard Error	DF	t Value	Pr > |t|
Education X Sex	0.1378	0.2715	42	0.51	0.6144
Row 2	0.1688	0.2698	42	0.63	0.5349
Row 3	0.1940	0.3447	42	0.56	0.5766

F Test for Estimates				
Label	Num DF	Den DF	F Value	Pr > F
Education X Sex	3	40	0.13	0.9447

Estimates					
Label	Estimate	Standard Error	DF	t Value	Pr > |t|
Marital Status X Sex	-0.2319	0.2123	42	-1.09	0.2810
Row 2	-0.1825	0.2082	42	-0.88	0.3858

F Test for Estimates				
Label	Num DF	Den DF	F Value	Pr > F
Marital Status X Sex	2	41	0.76	0.4730

Numbers for Table 8.9 and 8.10 Interaction Testing for Preliminary Model Predicting MDE Outcome

The SURVEYLOGISTIC Procedure

Model Information		
Data Set	WORK.C8_NCSR	
Response Variable	mde	Major Depressive Episode 1=Yes 0=No
Number of Response Levels	2	
Stratum Variable	sestrat	SAMPLING ERROR STRATUM
Number of Strata	42	
Cluster Variable	seclustr	SAMPLING ERROR CLUSTER
Number of Clusters	84	
Model	Binary Logit	
Optimization Technique	Fisher's Scoring	
Variance Adjustment	Degrees of Freedom (DF)	

Variance Estimation	
Method	Taylor Series
Variance Adjustment	Degrees of Freedom (DF)

Number of Observations Read	9282
Number of Observations Used	5692

Response Profile		
Ordered Value	mde	Total Frequency
1	No	3896
2	Yes	1796

Probability modeled is mde='Yes'.

3590 observations were deleted due to missing values for the response or explanatory variables.

Class Level Information				
Class	Value	Design Variables		
ag4cat	18-29	0	0	0
	30-44	1	0	0
	45-59	0	1	0
	60+	0	0	1
sex	F	1		
	M	0		
ED4CAT	0-11	0	0	0
	12	1	0	0
	13-15	0	1	0
	16+	0	0	1
MAR3CAT	Currently Married	0	0	
	Never Married	1	0	

Class Level Information				
Class	Value	Design Variables		
	Previously Married	0	1	

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	7099.406	6233.479
SC	7106.053	6379.709
-2 Log L	7097.406	6189.479

Testing Global Null Hypothesis: BETA=0				
Test	F Value	Num DF	Den DF	Pr > F
Likelihood Ratio	31.33	4.7111	197.87	<.0001
Score	48.89	21	22	<.0001
Wald	7.68	21	22	<.0001
NOTE: Second-order Rao-Scott design correction 3.4575 applied to the Likelihood Ratio test.				

Joint Tests				
Effect	F Value	Num DF	Den DF	Pr > F
ag4cat	0.77	3	40	0.5198
sex	7.29	1	42	0.0099
ald	0.55	1	42	0.4623
ED4CAT	2.99	3	40	0.0420
MAR3CAT	2.26	2	41	0.1167
ncsrwtlg	7.81	1	42	0.0078
ncsrwtlg*ag4cat	3.51	3	40	0.0238
ncsrwtlg*sex	0.08	1	42	0.7818
ald*ncsrwtlg	7.42	1	42	0.0094
ncsrwtlg*ED4CAT	1.92	3	40	0.1412
ncsrwtlg*MAR3CAT	0.82	2	41	0.4462

Under full-rank parameterizations, Type 3 effect tests are replaced by joint tests. The joint test for an effect is a test that all the parameters associated with that effect are zero. Such joint tests might not be equivalent to Type 3 effect tests under GLM parameterization.

Analysis of Maximum Likelihood Estimates					
Parameter		Estimate	Standard Error	t Value	Pr > |t|
Intercept		-0.4673	0.3045	-1.53	0.1324
ag4cat	30-44	0.1751	0.1589	1.10	0.2767

Analysis of Maximum Likelihood Estimates					
Parameter		Estimate	Standard Error	t Value	Pr > |t|
ag4cat	45-59	0.2974	0.2051	1.45	0.1544
ag4cat	60+	0.1899	0.2388	0.80	0.4309
sex	F	0.3984	0.1475	2.70	0.0099
ald		-0.1937	0.2611	-0.74	0.4623
ED4CAT	12	0.3697	0.1371	2.70	0.0100
ED4CAT	13-15	0.4460	0.1675	2.66	0.0109
ED4CAT	16+	0.4440	0.2248	1.98	0.0548
MAR3CAT	Never Married	0.2773	0.1626	1.71	0.0954
MAR3CAT	Previously Married	0.2684	0.1616	1.66	0.1043
ncsrwtlg		-1.3174	0.4714	-2.79	0.0078
ncsrwtlg*ag4cat	30-44	0.2127	0.1938	1.10	0.2786
ncsrwtlg*ag4cat	45-59	0.1590	0.2220	0.72	0.4777
ncsrwtlg*ag4cat	60+	-0.4017	0.2802	-1.43	0.1590
ncsrwtlg*sex	F	-0.0483	0.1734	-0.28	0.7818
ald*ncsrwtlg		1.2116	0.4449	2.72	0.0094
ncsrwtlg*ED4CAT	12	-0.3289	0.1851	-1.78	0.0828
ncsrwtlg*ED4CAT	13-15	-0.4886	0.2072	-2.36	0.0231
ncsrwtlg*ED4CAT	16+	-0.5956	0.3233	-1.84	0.0725
ncsrwtlg*MAR3CAT	Never Married	0.1160	0.1838	0.63	0.5316
ncsrwtlg*MAR3CAT	Previously Married	0.2098	0.1659	1.26	0.2130
NOTE: The degrees of freedom for the t tests is 42.					

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	71.9	Somers' D	0.440
Percent Discordant	27.8	Gamma	0.442
Percent Tied	0.3	Tau-a	0.190
Pairs	6997216	c	0.720

Estimates					
Label	Estimate	Standard Error	DF	t Value	Pr > |t|
Weight and Weight Interactions	-1.3174	0.4714	42	-2.79	0.0078
Row 2	0.2127	0.1938	42	1.10	0.2786
Row 3	0.1590	0.2220	42	0.72	0.4777
Row 4	-0.4017	0.2802	42	-1.43	0.1590
Row 5	-0.04834	0.1734	42	-0.28	0.7818
Row 6	1.2116	0.4449	42	2.72	0.0094
Row 7	-0.3289	0.1851	42	-1.78	0.0828
Row 8	-0.4886	0.2072	42	-2.36	0.0231
Row 9	-0.5956	0.3233	42	-1.84	0.0725
Row 10	0.1160	0.1838	42	0.63	0.5316

Estimates					
Label	Estimate	Standard Error	DF	t Value	Pr > |t|
Row 11	0.2098	0.1659	42	1.26	0.2130

F Test for Estimates				
Label	Num DF	Den DF	F Value	Pr > F
Weight and Weight Interactions	11	32	7.15	<.0001

Numbers for Table 8.12
Logistic Regression

The SURVEYLOGISTIC Procedure

Model Information		
Data Set	WORK.C8_NCSR	
Response Variable	ald	Alcohol Dependence 1=Yes 0=No
Number of Response Levels	2	
Stratum Variable	sestrat	SAMPLING ERROR STRATUM
Number of Strata	42	
Cluster Variable	seclustr	SAMPLING ERROR CLUSTER
Number of Clusters	84	
Weight Variable	ncsrwtlg	NCSR sample part 2 weight
Model	Binary Logit	
Optimization Technique	Fisher's Scoring	
Variance Adjustment	Degrees of Freedom (DF)	

Variance Estimation	
Method	Taylor Series
Variance Adjustment	Degrees of Freedom (DF)

Number of Observations Read	9282
Number of Observations Used	5692
Sum of Weights Read	5692
Sum of Weights Used	5692

Response Profile			
Ordered Value	ald	Total Frequency	Total Weight
1	No	5249	5384.2607
2	Yes	443	307.7398

Probability modeled is ald='Yes'.

3590 observations having nonpositive frequencies or weights were excluded since they do not contribute to the analysis.

Class Level Information				
Class	Value	Design Variables		
ag4cat	18-29	0	0	0
	30-44	1	0	0
	45-59	0	1	0
	60+	0	0	1
sex	F	1		
	M	0		
ED4CAT	0-11	0	0	0
	12	1	0	0

Class Level Information				
Class	Value	Design Variables		
	13-15	0	1	0
	16+	0	0	1
MAR3CAT	Currently Married	0	0	
	Never Married	1	0	
	Previously Married	0	1	

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	2396.234	2288.902
SC	2402.880	2355.371
-2 Log L	2394.234	2268.902

Testing Global Null Hypothesis: BETA=0				
Test	F Value	Num DF	Den DF	Pr > F
Likelihood Ratio	14.40	6.2999	264.59	<.0001
Score	22.81	9	34	<.0001
Wald	23.44	9	34	<.0001
NOTE: Second-order Rao-Scott design correction 0.4286 applied to the Likelihood Ratio test.				

Type 3 Analysis of Effects				
Effect	F Value	Num DF	Den DF	Pr > F
ag4cat	12.04	3	40	<.0001
sex	70.10	1	42	<.0001
ED4CAT	4.79	3	40	0.0061
MAR3CAT	6.53	2	41	0.0035

Analysis of Maximum Likelihood Estimates					
Parameter		Estimate	Standard Error	t Value	Pr > |t|
Intercept		-2.1263	0.2188	-9.72	<.0001
ag4cat	30-44	0.1463	0.1783	0.82	0.4166
ag4cat	45-59	-0.0507	0.1440	-0.35	0.7266
ag4cat	60+	-1.1203	0.2127	-5.27	<.0001
sex	F	-0.9980	0.1192	-8.37	<.0001
ED4CAT	12	-0.2684	0.1939	-1.38	0.1735
ED4CAT	13-15	-0.2645	0.1763	-1.50	0.1410

Analysis of Maximum Likelihood Estimates					
Parameter		Estimate	Standard Error	t Value	Pr > |t|
ED4CAT	16+	-0.7362	0.1973	-3.73	0.0006
MAR3CAT	Never Married	0.0653	0.1688	0.39	0.7008
MAR3CAT	Previously Married	0.5178	0.1422	3.64	0.0007
NOTE: The degrees of freedom for the t tests is 42.					

Odds Ratio Estimates			
Effect	Point Estimate	95% Confidence Limits	
ag4cat 30-44 vs 18-29	1.158	0.808	1.659
ag4cat 45-59 vs 18-29	0.951	0.711	1.271
ag4cat 60+ vs 18-29	0.326	0.212	0.501
sex F vs M	0.369	0.290	0.469
ED4CAT 12 vs 0-11	0.765	0.517	1.131
ED4CAT 13-15 vs 0-11	0.768	0.538	1.096
ED4CAT 16+ vs 0-11	0.479	0.322	0.713
MAR3CAT Never Married vs Currently Married	1.067	0.759	1.501
MAR3CAT Previously Married vs Currently Married	1.678	1.260	2.236
NOTE: The degrees of freedom in computing the confidence limits is 42.			

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	65.0	Somers' D	0.334
Percent Discordant	31.5	Gamma	0.346
Percent Tied	3.5	Tau-a	0.048
Pairs	2325307	c	0.667

Numbers for Table 8.12
Probit Regression

The SURVEYLOGISTIC Procedure

Model Information		
Data Set	WORK.C8_NCSR	
Response Variable	ald	Alcohol Dependence 1=Yes 0=No
Number of Response Levels	2	
Stratum Variable	sestrat	SAMPLING ERROR STRATUM
Number of Strata	42	
Cluster Variable	seclustr	SAMPLING ERROR CLUSTER
Number of Clusters	84	
Weight Variable	ncsrwtlg	NCSR sample part 2 weight
Model	Binary Probit	
Optimization Technique	Fisher's Scoring	
Variance Adjustment	Degrees of Freedom (DF)	

Variance Estimation	
Method	Taylor Series
Variance Adjustment	Degrees of Freedom (DF)

Number of Observations Read	9282
Number of Observations Used	5692
Sum of Weights Read	5692
Sum of Weights Used	5692

Response Profile			
Ordered Value	ald	Total Frequency	Total Weight
1	No	5249	5384.2607
2	Yes	443	307.7398

Probability modeled is ald='Yes'.

3590 observations having nonpositive frequencies or weights were excluded since they do not contribute to the analysis.

Class Level Information				
Class	Value	Design Variables		
ag4cat	18-29	0	0	0
	30-44	1	0	0
	45-59	0	1	0
	60+	0	0	1
sex	F	1		
	M	0		
ED4CAT	0-11	0	0	0
	12	1	0	0

Class Level Information				
Class	Value	Design Variables		
	13-15	0	1	0
	16+	0	0	1
MAR3CAT	Currently Married	0	0	
	Never Married	1	0	
	Previously Married	0	1	

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	2396.234	2287.418
SC	2402.880	2353.886
-2 Log L	2394.234	2267.418

Testing Global Null Hypothesis: BETA=0				
Test	F Value	Num DF	Den DF	Pr > F
Likelihood Ratio	14.35	6.2473	262.38	<.0001
Score	34.06	9	34	<.0001
Wald	21.68	9	34	<.0001
NOTE: Second-order Rao-Scott design correction 0.4406 applied to the Likelihood Ratio test.				

Type 3 Analysis of Effects				
Effect	F Value	Num DF	Den DF	Pr > F
ag4cat	15.22	3	40	<.0001
sex	68.24	1	42	<.0001
ED4CAT	4.76	3	40	0.0063
MAR3CAT	6.53	2	41	0.0034

Analysis of Maximum Likelihood Estimates					
Parameter		Estimate	Standard Error	t Value	Pr > |t|
Intercept		-1.2486	0.1062	-11.75	<.0001
ag4cat	30-44	0.0653	0.0855	0.76	0.4490
ag4cat	45-59	-0.0345	0.0674	-0.51	0.6118
ag4cat	60+	-0.5313	0.0938	-5.66	<.0001
sex	F	-0.4708	0.0570	-8.26	<.0001
ED4CAT	12	-0.1238	0.0950	-1.30	0.1999
ED4CAT	13-15	-0.1244	0.0851	-1.46	0.1513

Analysis of Maximum Likelihood Estimates					
Parameter		Estimate	Standard Error	t Value	Pr > |t|
ED4CAT	16+	-0.3396	0.0924	-3.67	0.0007
MAR3CAT	Never Married	0.0389	0.0780	0.50	0.6202
MAR3CAT	Previously Married	0.2548	0.0702	3.63	0.0008
NOTE: The degrees of freedom for the t tests is 42.					

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	64.9	Somers' D	0.335
Percent Discordant	31.4	Gamma	0.348
Percent Tied	3.8	Tau-a	0.048
Pairs	2325307	c	0.667

Numbers for Table 8.12
CLOGLOG Regression

The SURVEYLOGISTIC Procedure

Model Information		
Data Set	WORK.C8_NCSR	
Response Variable	ald	Alcohol Dependence 1=Yes 0=No
Number of Response Levels	2	
Stratum Variable	sestrat	SAMPLING ERROR STRATUM
Number of Strata	42	
Cluster Variable	seclustr	SAMPLING ERROR CLUSTER
Number of Clusters	84	
Weight Variable	ncsrwtlg	NCSR sample part 2 weight
Model	Binary Cloglog	
Optimization Technique	Fisher's Scoring	
Variance Adjustment	Degrees of Freedom (DF)	

Variance Estimation	
Method	Taylor Series
Variance Adjustment	Degrees of Freedom (DF)

Number of Observations Read	9282
Number of Observations Used	5692
Sum of Weights Read	5692
Sum of Weights Used	5692

Response Profile			
Ordered Value	ald	Total Frequency	Total Weight
1	No	5249	5384.2607
2	Yes	443	307.7398

Probability modeled is ald='Yes'.

3590 observations having nonpositive frequencies or weights were excluded since they do not contribute to the analysis.

Class Level Information				
Class	Value	Design Variables		
ag4cat	18-29	0	0	0
	30-44	1	0	0
	45-59	0	1	0
	60+	0	0	1
sex	F	1		
	M	0		
ED4CAT	0-11	0	0	0
	12	1	0	0

Class Level Information				
Class	Value	Design Variables		
	13-15	0	1	0
	16+	0	0	1
MAR3CAT	Currently Married	0	0	
	Never Married	1	0	
	Previously Married	0	1	

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	2396.234	2289.159
SC	2402.880	2355.627
-2 Log L	2394.234	2269.159

Testing Global Null Hypothesis: BETA=0				
Test	F Value	Num DF	Den DF	Pr > F
Likelihood Ratio	14.40	6.3204	265.46	<.0001
Score	22.81	9	34	<.0001
Wald	24.11	9	34	<.0001
NOTE: Second-order Rao-Scott design correction 0.4240 applied to the Likelihood Ratio test.				

Type 3 Analysis of Effects				
Effect	F Value	Num DF	Den DF	Pr > F
ag4cat	11.59	3	40	<.0001
sex	70.42	1	42	<.0001
ED4CAT	4.77	3	40	0.0062
MAR3CAT	6.54	2	41	0.0034

Analysis of Maximum Likelihood Estimates					
Parameter		Estimate	Standard Error	t Value	Pr > |t|
Intercept		-2.1832	0.2096	-10.41	<.0001
ag4cat	30-44	0.1430	0.1714	0.83	0.4086
ag4cat	45-59	-0.0452	0.1398	-0.32	0.7478
ag4cat	60+	-1.0829	0.2083	-5.20	<.0001
sex	F	-0.9652	0.1150	-8.39	<.0001
ED4CAT	12	-0.2601	0.1848	-1.41	0.1667
ED4CAT	13-15	-0.2556	0.1686	-1.52	0.1370

Analysis of Maximum Likelihood Estimates					
Parameter		Estimate	Standard Error	t Value	Pr > |t|
ED4CAT	16+	-0.7127	0.1906	-3.74	0.0006
MAR3CAT	Never Married	0.0605	0.1638	0.37	0.7138
MAR3CAT	Previously Married	0.4935	0.1353	3.65	0.0007
NOTE: The degrees of freedom for the t tests is 42.					

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	64.9	Somers' D	0.335
Percent Discordant	31.4	Gamma	0.348
Percent Tied	3.7	Tau-a	0.048
Pairs	2325307	c	0.668