SAS Output for Problem 1

The FREQ Procedure

Frequency Row Pct	Table of smoke by depress		
	depress		
smoke	yes	no	Total
yes	144 7.69	1729 92.31	1873
no	50 3.73	1290 96.27	1340
Total	194	3019	3213

Statistics for Table of smoke by depress

Statistic	DF	Value	Prob
Chi-Square	1	21.5570	<.0001
Likelihood Ratio Chi-Square	1	22.7549	<.0001

Odds Ratio and Relative Risks			
Statistic	Value	95% Confidence Limits	
Odds Ratio	2.1488	1.5452	2.9880
Relative Risk (Column 1)	2.0604	1.5052	2.8205
Relative Risk (Column 2)	0.9589	0.9429	0.9751

Frequency Row Pct	Table 1 of smoke by depress Controlling for gender=female		
	depress		
smoke	yes	no	Total
yes	104 11.02	840 88.98	944
no	40 4.38	873 95.62	913
Total	144	1713	1857

Statistics for Table 1 of smoke by depress
Controlling for gender=female

Statistic	DF	Value	Prob
Chi-Square	1	28.5706	<.0001
Likelihood Ratio Chi-Square	1	29.5821	<.0001

Odds Ratio and Relative Risks			
Statistic	Value	95% Confidence Limits	
Odds Ratio	2.7021	1.8539	3.9385
Relative Risk (Column 1)	2.5146	1.7665	3.5796
Relative Risk (Column 2)	0.9306	0.9064	0.9555

Sample Size = 1857

Frequency Row Pct	Table 2 of smoke by depress Controlling for gender=male		
	depress		
smoke	yes	no	Total
yes	40 4.31	889 95.69	929
no	10 2.34	417 97.66	427
Total	50	1306	1356

Statistics for Table 2 of smoke by depress
Controlling for gender=male

Statistic	DF	Value	Prob
Chi-Square	1	3.1767	0.0747
Likelihood Ratio Chi-Square	1	3.4417	0.0636

Odds Ratio and Relative Risks			
Statistic	Value	95% Confidence Limits	
Odds Ratio	1.8763	0.9293	3.7884
Relative Risk (Column 1)	1.8385	0.9283	3.6414
Relative Risk (Column 2)	0.9799	0.9604	0.9997

Summary Statistics for smoke by depress
Controlling for gender

Cochran-Mantel-Haenszel Statistics (Based on Table Scores)				
Statistic	Alternative Hypothesis	DF	Value	Prob
1	Nonzero Correlation	1	30.6184	<.0001
2	Row Mean Scores Differ	1	30.6184	<.0001
3	General Association	1	30.6184	<.0001

Common Odds Ratio and Relative Risks				
Statistic	Method	Value	95% Confidence Limits	
Odds Ratio	Mantel-Haenszel	2.4825	1.7791	3.4639
	Logit	2.4908	1.7870	3.4717
Relative Risk (Column 1)	Mantel-Haenszel	2.3442	1.7139	3.2065
	Logit	2.3540	1.7202	3.2215
Relative Risk (Column 2)	Mantel-Haenszel	0.9499	0.9332	0.9669
	Logit	0.9616	0.9463	0.9770

Breslow-Day Test for Homogeneity of the Odds Ratios	
Chi-Square	0.8084
DF	1
Pr > ChiSq	0.3686

Total Sample Size = 3213

SAS Output for Problem 4

Output for Model A:

Class Level Information			
Class	Value	Design Variables	
ses	0	1	0
	1	0	1
	2	0	0
race	0	1	
	1	0	
agegroup	1	1	0
	2	0	1
	3	0	0

Criteria For Assessing Goodness Of Fit			
Criterion	DF	Value	Value/DF
Deviance	275	378.6601	1.3769
Scaled Deviance	275	378.6601	1.3769
Pearson Chi-Square	275	432.9560	1.5744
Scaled Pearson X2	275	432.9560	1.5744
Log Likelihood		-245.6643	
Full Log Likelihood		-322.8302	
AIC (smaller is better)		663.6604	
AICC (smaller is better)		664.3173	
BIC (smaller is better)		696.5012	

LR Statistics For Type 3 Analysis			
Source	DF	Chi-Square	Pr > ChiSq
passive	1	3.69	0.0549
crowding	1	10.00	0.0016
ses	2	1.32	0.5168
race	1	1.21	0.2720
agegroup	2	13.64	0.0011
risk	1	8.11	0.0044

Analysis Of Maximum Likelihood Parameter Estimates							
Parameter		DF	Estimate	Standard Error	Wald 95% Confidence Limits	Wald Chi-Square	Pr > ChiSq
Intercept		1	-1.5430	0.5464	-2.6139 -0.4721	7.98	0.0047
passive		1	0.3181	0.1673	-0.0098 0.6461	3.62	0.0572
crowding		1	0.5062	0.1615	0.1898 0.8227	9.83	0.0017
ses	0	1	-0.1639	0.2218	-0.5986 0.2708	0.55	0.4600
ses	1	1	0.0451	0.1982	-0.3433 0.4335	0.05	0.8199
race	0	1	0.1857	0.1709	-0.1493 0.5207	1.18	0.2772
agegroup	1	1	0.5545	0.6793	-0.7770 1.8859	0.67	0.4144
agegroup	2	1	1.8171	0.5981	0.6448 2.9893	9.23	0.0024
risk		1	-0.0320	0.0111	-0.0537 -0.0103	8.35	0.0039
Scale		0	1.0000	0.0000	1.0000 1.0000		

Output for Model B:

Criteria For Assessing Goodness Of Fit			
Criterion	DF	Value	Value/DF
Deviance	278	389.3530	1.4006
Scaled Deviance	278	389.3530	1.4006
Pearson Chi-Square	278	442.4100	1.5914
Scaled Pearson X2	278	442.4100	1.5914
Log Likelihood		-251.0108	
Full Log Likelihood		-328.1767	
AIC (smaller is better)		668.3533	
AICC (smaller is better)		668.6566	
BIC (smaller is better)		690.2471	

LR Statistics For Type 3 Analysis			
Source	DF	Chi-Square	Pr > ChiSq
passive	1	9.64	0.0019
crowding	1	15.66	<.0001
race	1	0.51	0.4758
agegroup	2	5.14	0.0767

Output for Model C:

Criteria For Assessing Goodness Of Fit			
Criterion	DF	Value	Value/DF
Deviance	275	252.7112	0.9189
Scaled Deviance	275	252.7112	0.9189
Pearson Chi-Square	275	282.3280	1.0266
Scaled Pearson X2	275	282.3280	1.0266
Log Likelihood		-231.8731	
Full Log Likelihood		-309.0390	
AIC (smaller is better)		638.0779	
AICC (smaller is better)		638.8838	
BIC (smaller is better)		674.5677	

LR Statistics For Type 3 Analysis			
Source	DF	Chi-Square	Pr > ChiSq
passive	1	2.13	0.1446
crowding	1	6.37	0.0116
ses	2	1.17	0.5585
race	1	0.43	0.5111
agegroup	2	10.14	0.0063
risk	1	6.61	0.0102

Analysis Of Maximum Likelihood Parameter Estimates							
Parameter		DF	Estimate	Standard Error	Wald 95% Confidence Limits	Wald Chi-Square	Pr > ChiSq
Intercept		1	-1.4390	0.6183	-2.6508 -0.2273	5.42	0.0199
passive		1	0.3038	0.2077	-0.1033 0.7110	2.14	0.1435
crowding		1	0.5034	0.1985	0.1144 0.8924	6.43	0.0112
ses	0	1	-0.2534	0.2836	-0.8093 0.3025	0.80	0.3717
ses	1	1	-0.0314	0.2653	-0.5513 0.4885	0.01	0.9057
race	0	1	0.1456	0.2217	-0.2890 0.5801	0.43	0.5115
agegroup	1	1	0.6437	0.7885	-0.9018 2.1892	0.67	0.4143
agegroup	2	1	2.0344	0.7272	0.6092 3.4596	7.83	0.0051
risk		1	-0.0379	0.0148	-0.0670 -0.0089	6.55	0.0105
Dispersion		1	0.7835	0.2277	0.4432 1.3848		

Note: The negative binomial dispersion parameter was estimated by maximum likelihood.