

performed by Inna Williams.

CHAPTER 3 Problem 1

```
proc format;
value FORMAT_GROUP
    1 = 'Control'
    2 = 'Aspirin'
    3 = 'Ibuprofen'
;
run;
```

CHAPTER 3 Problem 3

```
a
proc format;
value $GENDER
    'M'='Male'
    'F'='Female'
;
value $PARTY
    '1'='Republican'
    '2'='Democrat'
    '3'='Not Registered'
;
value YESNO
    0='No'
    1='Yes'
;
data Survey_Data;
    input ID 1-3 GENDER $ 4 PARTY $ 5 VOTE 6 FOREIGN 7 SPEND 8;

label
    PARTY='Political Party'
    VOTE='Vote in the last election'
    FOREIGN='Agree with the government foreign policy?'
    SPEND='Should we increase domestic spending'
;
format GENDER $GENDER.
    PARTY $PARTY.
    VOTE FOREIGN SPEND YESNO.
;
```

```

cards;
007M1110
013F2101
137F1001
117 1111
428M3110
017F3101
037M2101
;
proc print data=Survey_Data;
title "Chapter 3 Problem 3 a";
Run;

```

Chapter 3 Problem 3 a

Obs	ID	GENDER	PARTY	VOTE	FOREIGN	SPEND
1	7	Male	Republican	Yes	Yes	No
2	13	Female	Democrat	Yes	No	Yes
3	137	Female	Republican	No	No	Yes
4	117		Republican	Yes	Yes	Yes
5	428	Male	Not Registered	Yes	Yes	No
6	17	Female	Not Registered	Yes	No	Yes
7	37	Male	Democrat	Yes	No	Yes

b)

```
proc freq data=Survey_Data;  
title "Chapter 3 Problem 3 b";  
tables GENDER PARTY VOTE FOREIGN SPEND;  
run;
```

Chapter 3 Problem 3 b

The FREQ Procedure

GENDER	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Female	3	50.00	3	50.00
Male	3	50.00	6	100.00
Frequency Missing = 1				

Political Party				
PARTY	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Republican	3	42.86	3	42.86
Democrat	2	28.57	5	71.43
Not Registered	2	28.57	7	100.00

Vote in the last election				
VOTE	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No	1	14.29	1	14.29
Yes	6	85.71	7	100.00

FOREIGN	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No	4	57.14	4	57.14
Yes	3	42.86	7	100.00

Should we increase domestic spending				
SPEND	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No	2	28.57	2	28.57
Yes	5	71.43	7	100.00

c)

```
proc freq data=Survey_Data;
title "Chapter 3 Problem 3 c";
tables VOTE*(SPEND FOREIGN) / CHISQ;
run;
```

Chapter 3 Problem 3 c

The FREQ Procedure

Frequency
Percent
Row Pct
Col Pct

Table of VOTE by SPEND			
VOTE(Vote in the last election)	SPEND(Should we increase domestic spending)		
	No	Yes	Total
No	0 0.00 0.00 0.00	1 14.29 100.00 20.00	1 14.29
Yes	2 28.57 33.33 100.00	4 57.14 88.87 80.00	6 85.71
Total	2 28.57	5 71.43	7 100.00

Statistics for Table of VOTE by SPEND

Statistic	DF	Value	Prob
Chi-Square	1	0.4887	0.4945
Likelihood Ratio Chi-Square	1	0.7376	0.3904
Continuity Adj. Chi-Square	1	0.0000	1.0000
Mantel-Haenszel Chi-Square	1	0.4000	0.5271
Phi Coefficient		-0.2582	
Contingency Coefficient		0.2500	
Cramer's V		-0.2582	
WARNING: 100% of the cells have expected counts less than 5. Chi-Square may not be a valid test.			

Fisher's Exact Test	
Cell (1,1) Frequency (F)	0
Left-sided Pr <= F	0.7143
Right-sided Pr >= F	1.0000
Table Probability (P)	0.7143
Two-sided Pr <= P	1.0000

Sample Size = 7

Frequency
Percent
Row Pct
Col Pct

Table of VOTE by FOREIGN			
VOTE(Vote in the last election)	FOREIGN		
	No	Yes	Total
No	1 14.29 100.00 25.00	0 0.00 0.00 0.00	1 14.29
Yes	3 42.86 50.00 75.00	3 42.86 50.00 100.00	6 85.71
Total	4 57.14	3 42.86	7 100.00

Statistics for Table of VOTE by FOREIGN

Statistic	DF	Value	Prob
Chi-Square	1	0.8750	0.3496
Likelihood Ratio Chi-Square	1	1.2429	0.2649
Continuity Adj. Chi-Square	1	0.0000	1.0000
Mantel-Haenszel Chi-Square	1	0.7500	0.3865
Phi Coefficient		0.3536	
Contingency Coefficient		0.3333	
Cramer's V		0.3536	
WARNING: 100% of the cells have expected counts less than 5. Chi-Square may not be a valid test.			

Fisher's Exact Test	
Cell (1,1) Frequency (F)	1
Left-sided Pr <= F	1.0000
Right-sided Pr >= F	0.5714
Table Probability (P)	0.5714
Two-sided Pr <= P	1.0000

Sample Size = 7

CHAPTER 3 Problem 5

```

/*using if */
data DEMOG;
input WEIGHT HEIGHT GENDER $;
if WEIGHT >= 0 and WEIGHT <= 100 then CATEGORYW=1;
else if WEIGHT >=101 and WEIGHT <= 150 then CATEGORYW=2;
else if WEIGHT >=151 and WEIGHT <=200 then CATEGORYW=3;
else if WEIGHT >200 then CATEGORYW=4;

if HEIGHT>=0 and HEIGHT<=70 then CATEGORYH=1;
else if HEIGHT>70 then CATEGORYH=2;
cards;

155 68 M
98 60 F
202 72 M
280 75 M
130 63 F
. 57 F
166 . M
;

proc freq data=DEMOG;
title 'Chapter 3 Problem 5 creating categories using if';
tables CATEGORYW*CATEGORYH;
Run;

```

Chapter 3 Problem 5 creating categories using if

The FREQ Procedure

Frequency Percent Row Pct Col Pct	Table of CATEGORYW by CATEGORYH			
	CATEGORYW	CATEGORYH		Total
		1	2	
1	1	1	0	1
		20.00	0.00	20.00
		100.00	0.00	
		33.33	0.00	
2	1	1	0	1
		20.00	0.00	20.00
		100.00	0.00	
		33.33	0.00	
3	1	1	0	1
		20.00	0.00	20.00
		100.00	0.00	
		33.33	0.00	
4	0	0	2	2
		0.00	40.00	40.00
		0.00	100.00	
		0.00	100.00	
Total	3	3	2	5
		60.00	40.00	100.00
Frequency Missing = 2				

```

/* using format */
proc format;
value CATEGORYW
            0-100=1
            101-150=2
            151-200=3
            200-HIGH=4;
value CATEGORYH
            0-70=1
            70-HIGH=2;

run;
data DEMOG_1;
input WEIGHT HEIGHT GENDER $;
format WEIGHT CATEGORYW. HEIGHT CATEGORYH.
;
cards;

155 68 M
98 60 F
202 72 M
280 75 M
130 63 F
. 57 F
166 . M
;

proc freq data=DEMOG_1;
title 'Chapter 3 Problem 5 creating categories using format';
tables WEIGHT*HEIGHT;
run;

```

Chapter 3 Problem 5 creating categories using format

The FREQ Procedure

Frequency
Percent
Row Pct
Col Pct

Table of WEIGHT by HEIGHT			
WEIGHT	HEIGHT		Total
	1	2	
1	1	0	1
	20.00	0.00	20.00
	100.00	0.00	
	33.33	0.00	
2	1	0	1
	20.00	0.00	20.00
	100.00	0.00	
	33.33	0.00	
3	1	0	1
	20.00	0.00	20.00
	100.00	0.00	
	33.33	0.00	
4	0	2	2
	0.00	40.00	40.00
	0.00	100.00	
	0.00	100.00	
Total	3	2	5
	60.00	40.00	100.00
Frequency Missing = 2			

CHAPTER 3 Problem 6

```
data LEUKEMIA_TO_EXPOSURE;
input group $ RADIATION $ COUNT;

cards;
CASE 1-EXPOSED 50
CASE 2-NEXPOSED 500
CONTROL 1-EXPOSED 40
CONTROL 2-NEXPOSED 500
;
proc freq data=LEUKEMIA_TO_EXPOSURE;
  title 'Chapter 3 Problem 6 Leukemia Exposure';
  tables RADIATION*GROUP / CHISQ cmh;
  weight count;
Run;
```

Chapter 3 Problem 6 Leukemia Exposure

The FREQ Procedure

Frequency Percent Row Pct Col Pct	Table of RADIATION by group		
	group		
RADIATION	CASE	CONTROL	Total
1-EXPOSE	50 4.59 55.56 9.09	40 3.67 44.44 7.41	90 8.28
2-NEXPOS	500 45.87 50.00 90.91	500 45.87 50.00 92.59	1000 91.74
Total	550 50.46	540 49.54	1090 100.00

Statistics for Table of RADIATION by group

Statistic	DF	Value	Prob
Chi-Square	1	1.0195	0.3126
Likelihood Ratio Chi-Square	1	1.0217	0.3121
Continuity Adj. Chi-Square	1	0.8093	0.3683
Mantel-Haenszel Chi-Square	1	1.0185	0.3129
Phi Coefficient		0.0306	
Contingency Coefficient		0.0306	
Cramer's V		0.0306	

Fisher's Exact Test	
Cell (1,1) Frequency (F)	50
Left-sided Pr <= F	0.8686
Right-sided Pr >= F	0.1842
Table Probability (P)	0.0529
Two-sided Pr <= P	0.3240

Sample Size = 1090

Summary Statistics for RADIATION by group

Cochran-Mantel-Haenszel Statistics (Based on Table Scores)				
Statistic	Alternative Hypothesis	DF	Value	Prob
1	Nonzero Correlation	1	1.0185	0.3129
2	Row Mean Scores Differ	1	1.0185	0.3129
3	General Association	1	1.0185	0.3129

Common Odds Ratio and Relative Risks				
Statistic	Method	Value	95% Confidence Limits	
Odds Ratio	Mantel-Haenszel	1.2500	0.8100	1.9290
	Logit	1.2500	0.8100	1.9290
Relative Risk (Column 1)	Mantel-Haenszel	1.1111	0.9143	1.3502
	Logit	1.1111	0.9143	1.3502
Relative Risk (Column 2)	Mantel-Haenszel	0.8889	0.6998	1.1290
	Logit	0.8889	0.6998	1.1290

Interpretation

$H_0 \rightarrow$ Having LEUKEMIA And being exposed to Radiation are independent of each other

Chi-square = 1.0195, p-value = 0.3126 > 0.05

therefore Decision is:

fail to reject H_0

There is not enough evidence that

the people with LEUKEMIA And being exposed to Radiation have significant relationship

Odds Ratio = 1.25

95% confidence =(0.8100-1.9290)

This means we can say that the true population odds ratio is in interval (0.8100-1.9290)

Since the interval contains 1 we can conclude that the odds ratio is not significant for $\alpha=0.05$

fail to reject H_0

There is not enough evidence that

the people with LEUKEMIA And being exposed to Radiation have significant relationship

CHAPTER 3 Problem 7

```
data SES_Astma;
input GROUP $ ASTMA $ COUNT;
cards;
LowSES 1-Yes 40
LowSES 2-No 100
HighSES 1-Yes 30
HighSES 2-No 130
;
proc freq data=SES_Astma;
  title 'Chapter 3 Problem 7 SES ASTMA';
  tables GROUP*ASTMA / CHISQ cmh;
  weight count;
run;
```

Chapter 3 Problem 7 SES ASTMA

The FREQ Procedure

Frequency Percent Row Pct Col Pct	Table of GROUP by ASTMA			
	GROUP	ASTMA		Total
		1-Yes	2-No	
HighSES	30	130	160	53.33
		10.00	43.33	
		18.75	81.25	
		42.86	56.52	
LowSES	40	100	140	46.67
		13.33	33.33	
		28.57	71.43	
		57.14	43.48	
Total	70	230	300	100.00
		23.33	76.67	

Statistics for Table of GROUP by ASTMA

Statistic	DF	Value	Prob
Chi-Square	1	4.0262	0.0448
Likelihood Ratio Chi-Square	1	4.0234	0.0449
Continuity Adj. Chi-Square	1	3.4959	0.0615
Mantel-Haenszel Chi-Square	1	4.0128	0.0452
Phi Coefficient		-0.1158	
Contingency Coefficient		0.1151	
Cramer's V		-0.1158	

Fisher's Exact Test

Cell (1,1) Frequency (F)	30
Left-sided Pr <= F	0.0308
Right-sided Pr >= F	0.9839
Table Probability (P)	0.0148
Two-sided Pr <= P	0.0552

Sample Size = 300

Summary Statistics for GROUP by ASTMA

Cochran-Mantel-Haenszel Statistics (Based on Table Scores)				
Statistic	Alternative Hypothesis	DF	Value	Prob
1	Nonzero Correlation	1	4.0128	0.0452
2	Row Mean Scores Differ	1	4.0128	0.0452
3	General Association	1	4.0128	0.0452

Common Odds Ratio and Relative Risks				
Statistic	Method	Value	95% Confidence Limits	
Odds Ratio	Mantel-Haenszel	0.5769	0.3361	0.9904
	Logit	0.5769	0.3361	0.9904
Relative Risk (Column 1)	Mantel-Haenszel	0.6563	0.4331	0.9943
	Logit	0.6563	0.4331	0.9943
Relative Risk (Column 2)	Mantel-Haenszel	1.1375	1.0003	1.2935
	Logit	1.1375	1.0003	1.2935

Total Sample Size = 300

Interpretation

Ho-> assume that Asthma and SES is independent variables

Chisq = 4.0262 p-value = 0.0448 ~ 0.05 = alpha = 0.05

therefore Decision is:

There is some not strong relationship between having
Asthma and SES

CHAPTER 3 Problem 8

```
proc freq data=SES_Astma;
  title 'Chapter 3 Problem 8 Relative Risk SES ASTMA';
  tables GROUP*ASTMA / CHISQ relrisk ;
  weight count;
run;
```

Chapter 3 Problem 8 Relative Risk SES ASTMA

The FREQ Procedure

Frequency Percent Row Pct Col Pct	Table of GROUP by ASTMA		
	GROUP	ASTMA	
		1-Yes	2-No
	HighSES	30 10.00 18.75 42.86	130 43.33 81.25 56.52
	LowSES	40 13.33 28.57 57.14	100 33.33 71.43 43.48
	Total	70 23.33	230 76.67
			300 100.00

Statistics for Table of GROUP by ASTMA

Statistic	DF	Value	Prob
Chi-Square	1	4.0262	0.0448
Likelihood Ratio Chi-Square	1	4.0234	0.0449
Continuity Adj. Chi-Square	1	3.4959	0.0615
Mantel-Haenszel Chi-Square	1	4.0128	0.0452
Phi Coefficient		-0.1158	
Contingency Coefficient		0.1151	
Cramer's V		-0.1158	

Fisher's Exact Test	
Cell (1,1) Frequency (F)	30
Left-sided Pr <= F	0.0308
Right-sided Pr >= F	0.9839
Table Probability (P)	0.0148
Two-sided Pr <= P	0.0552

Odds Ratio and Relative Risks			
Statistic	Value	95% Confidence Limits	
Odds Ratio	0.5769	0.3361	0.9904
Relative Risk (Column 1)	0.6563	0.4331	0.9943
Relative Risk (Column 2)	1.1375	1.0003	1.2935

Interpretation

Relative Risk for Low SES = 0.6563

95%CI = (0.4331 0.9943)

This means that with 95% confidence we can say that
Relative Risk for Low SES is in within (0.4331-0.6563) interval
This interval does not contain 1 and therefore for $\alpha=0.05$ we reject H_0 and
conclude That there is a relationship between having Asthma and SES.

CHAPTER 3 Problem 11

```
data VDT_MISCARRIAGES;
input GROUP $ MISCARRIAGES $ COUNT;
cards;
CASE_MIS 1-Yes 30
CASE_MIS 2-No 50
CONTROL 1-Yes 90
CONTROL 2-No 200
;

proc freq data=VDT_MISCARRIAGES;
title 'Chapter 3 Problem 11 VDT Miscarriages';
tables GROUP*MISCARRIAGES / CHISQ cmh;
weight count;
run;
```


Chapter 3 Problem 11 VDT Miscarriages

The FREQ Procedure

Frequency Percent Row Pct Col Pct	Table of GROUP by MISCARRIAGES			
	GROUP	MISCARRIAGES		
		1-Yes	2-No	Total
	CASE_MIS	30	50	80
		8.11	13.51	21.62
		37.50	62.50	
		25.00	20.00	
	CONTROL	90	200	290
		24.32	54.05	78.38
		31.03	68.97	
		75.00	80.00	
	Total	120	250	370
		32.43	67.57	100.00

Statistics for Table of GROUP by MISCARRIAGES

Statistic	DF	Value	Prob
Chi-Square	1	1.1961	0.2741
Likelihood Ratio Chi-Square	1	1.1754	0.2783
Continuity Adj. Chi-Square	1	0.9193	0.3377
Mantel-Haenszel Chi-Square	1	1.1929	0.2747
Phi Coefficient		0.0569	
Contingency Coefficient		0.0568	
Cramer's V		0.0569	

Fisher's Exact Test	
Cell (1,1) Frequency (F)	30
Left-sided Pr <= F	0.8897
Right-sided Pr >= F	0.1688
Table Probability (P)	0.0583
Two-sided Pr <= P	0.2829

Sample Size = 370

Summary Statistics for GROUP by MISCARRIAGES

Cochran-Mantel-Haenszel Statistics (Based on Table Scores)				
Statistic	Alternative Hypothesis	DF	Value	Prob
1	Nonzero Correlation	1	1.1929	0.2747
2	Row Mean Scores Differ	1	1.1929	0.2747
3	General Association	1	1.1929	0.2747

Common Odds Ratio and Relative Risks				
Statistic	Method	Value	95% Confidence Limits	
Odds Ratio	Mantel-Haenszel	1.3333	0.7955	2.2349
	Logit	1.3333	0.7955	2.2349
Relative Risk (Column 1)	Mantel-Haenszel	1.2083	0.8680	1.6822
	Logit	1.2083	0.8680	1.6822
Relative Risk (Column 2)	Mantel-Haenszel	0.9063	0.7521	1.0920
	Logit	0.9063	0.7521	1.0920

Total Sample Size = 370

Interpretation

Ho -> Assume that using VDT and having a miscarriage are independent variables

Chisq = 1.1961 p-value = 0.2741 > 0.05

therefore Decision is:

fail to reject Ho

There is not enough evidence that

using VDT and having a miscarriage have significant relationship

Odds Ratio = 1.3333 95% CI = (0.7955 2.2349)

We can say with 95% confidence that the odds ratio is
in interval(0.7955 2.2349)

CHAPTER 3 Problem 13

```
data SPB_Children;
input GROUP $ BEHAVIOR $ COUNT;

cards;
STANDARD 1-Yes 30
STANDARD 2-No 220
S_PROOFED 1-Yes 20
S_PROOFED 2-No 280
;
proc freq data=SPB_Children;
title 'Chapter 3 Problem 13 Sound Proof Behaviour Of Children';
tables GROUP*BEHAVIOR / relrisk ;
weight count;
run;
```

Chapter 3 Problem 13 Sound Proof Behaviour Of Children

The FREQ Procedure

Frequency Percent Row Pct Col Pct	Table of GROUP by BEHAVIOR			
	GROUP	BEHAVIOR		
		1-Yes	2-No	Total
	STANDARD	30 5.45 12.00 60.00	220 40.00 88.00 44.00	250 45.45
	S_PROOFE	20 3.64 6.67 40.00	280 50.91 93.33 56.00	300 54.55
Total	50 9.09	500 90.91	550 100.00	

Statistics for Table of GROUP by BEHAVIOR

Odds Ratio and Relative Risks			
Statistic	Value	95% Confidence Limits	
Odds Ratio	1.9091	1.0554	3.4533
Relative Risk (Column 1)	1.8000	1.0486	3.0898
Relative Risk (Column 2)	0.9429	0.8925	0.9960

Sample Size = 550

Interpretation

Ho -> Problems are depend on noise

Relative Risk (Column 1->noisy classroom) = 1.8000

95% CI = (1.0486 3.0898). This interval does not contain 1

We can say with 95% confidence that Relative Risk for producing behavioral problems is in interval(1.0486 3.089)

We can say That Relative Risk is significant and we reject Ho

We can Conclude that noise and incidence of problems are depend on each other.

CHAPTER 3 Problem 15

```
proc format;
value SIZE
    1 = 'Small'
    2 = 'Medium'
    3 = 'Large'
    4 = 'Gigantic'
;

run;

data CLASS;
input SIZE PROBLEM $ COUNT @@;
format SIZE SIZE.;
cards;
1 1-YES 3 1 2-NO 12 2 1-YES 6 2 2-NO 22
3 1-YES 17 3 2-NO 38 4 1-YES 80 4 2-NO 120
;

proc freq data=CLASS;
title 'Chapter 3 Problem 15 CLASS Size and Behavior';
tables PROBLEM*SIZE / CHISQ;
weight count;
run;
```

Chapter 3 Problem 15 CLASS Size and Behavior

The FREQ Procedure

Frequency Percent Row Pct Col Pct	Table of PROBLEM by SIZE					
	PROBLEM	SIZE				
		Small	Medium	Large	Gigantic	Total
	1-YES	3 1.01 2.83 20.00	6 2.01 5.66 21.43	17 5.70 16.04 30.91	80 26.85 75.47 40.00	106 35.57
	2-NO	12 4.03 6.25 80.00	22 7.38 11.46 78.57	38 12.75 19.79 69.09	120 40.27 62.50 60.00	192 64.43
	Total	15 5.03	28 9.40	55 18.46	200 67.11	298 100.00

Statistics for Table of PROBLEM by SIZE

Statistic	DF	Value	Prob
Chi-Square	3	6.2639	0.0995
Likelihood Ratio Chi-Square	3	6.6063	0.0856
Mantel-Haenszel Chi-Square	1	6.0375	0.0140
Phi Coefficient		0.1450	
Contingency Coefficient		0.1435	
Cramer's V		0.1450	

Sample Size = 298

Interpretation

Ho -> Assume that Problem is independent from SIZE

Mantel-Haenszel Chi-Square for trend = 6.0375 p-value=0.0140 < 0.05

therefore Decision is:

reject Ho and conclude that the problem significantly dependent on a size.

CHAPTER 3 Problem 16

```
data HEART_ATTACKS_AND_STROCKS;
input DESEASE_GROUP $ GROUP $ RESULTS $ COUNT;

cards;
HA ASPIRIN 1-YES 80
STROKE ASPIRIN 1-YES 65
HA ASPIRIN 2-NO 920
STROKE ASPIRIN 2-NO 935
HA PLASEBO 1-YES 240
STROKE PLASEBO 1-YES 165
HA PLASEBO 2-NO 1760
STROKE PLASEBO 2-NO 1835
;
proc freq data=heart_attacks_and_strocks;
title 'Chapter 3 Problem 16 Aspirin On HA and Strokes';
tables DESEASE_GROUP*GROUP*RESULTS / all;
weight COUNT;
run;
```

Chapter 3 Problem 16 Aspirin On HA and Strokes

The FREQ Procedure

Frequency Percent Row Pct Col Pct	Table 1 of RESULTS by GROUP			
	Controlling for DESEASE_GROUP=HA			
	GROUP			RESULTS
	ASPIRIN	PLASEBO	Total	
1-YES	80	80	160	
	50.00	50.00	100.00	
	50.00	50.00		
	100.00	100.00		
Total	80	80	160	
	50.00	50.00	100.00	

Frequency Percent Row Pct Col Pct	Table 2 of RESULTS by GROUP			
	Controlling for DESEASE_GROUP=STROKE			
	GROUP			RESULTS
	ASPIRIN	PLASEBO	Total	
1-YES	65	65	130	
	50.00	50.00	100.00	
	50.00	50.00		
	100.00	100.00		
Total	65	65	130	
	50.00	50.00	100.00	

Chapter 3 Problem 16 Aspirin On HA and Strokes

The FREQ Procedure

Frequency
Percent
Row Pct
Col Pct

Table 1 of GROUP by RESULTS			
Controlling for DESEASE_GROUP=HA			
GROUP	RESULTS		
	1-YES	2-NO	Total
ASPIRIN	80	920	1000
	2.67	30.67	33.33
	8.00	92.00	
	25.00	34.33	
PLASEBO	240	1760	2000
	8.00	58.67	66.67
	12.00	88.00	
	75.00	65.67	
Total	320	2680	3000
	10.67	89.33	100.00

Statistics for Table 1 of GROUP by RESULTS
Controlling for DESEASE_GROUP=HA

Statistic	DF	Value	Prob
Chi-Square	1	11.1940	0.0008
Likelihood Ratio Chi-Square	1	11.6949	0.0008
Continuity Adj. Chi-Square	1	10.7782	0.0010
Mantel-Haenszel Chi-Square	1	11.1903	0.0008
Phi Coefficient		-0.0611	
Contingency Coefficient		0.0610	
Cramer's V		-0.0611	

Fisher's Exact Test	
Cell (1,1) Frequency (F)	80
Left-sided Pr <= F	0.0004
Right-sided Pr >= F	0.9997
Table Probability (P)	0.0002
Two-sided Pr <= P	0.0007

Statistic	Value	ASE
Gamma	-0.2212	0.0644
Kendall's Tau-b	-0.0611	0.0170
Stuart's Tau-c	-0.0356	0.0100
Somers' D C R	-0.0400	0.0112
Somers' D R C	-0.0933	0.0259
Pearson Correlation	-0.0611	0.0170
Spearman Correlation	-0.0611	0.0170
Lambda Asymmetric C R	0.0000	0.0000
Lambda Asymmetric R C	0.0000	0.0000
Lambda Symmetric	0.0000	0.0000
Uncertainty Coefficient C R	0.0057	0.0033
Uncertainty Coefficient R C	0.0031	0.0017
Uncertainty Coefficient Symmetric	0.0040	0.0023

Odds Ratio and Relative Risks			
Statistic	Value	95% Confidence Limits	
Odds Ratio	0.6377	0.4891	0.8314
Relative Risk (Column 1)	0.6667	0.5237	0.8487
Relative Risk (Column 2)	1.0455	1.0202	1.0713

Sample Size = 3000

Frequency Percent Row Pct Col Pct	Table 2 of GROUP by RESULTS			
	Controlling for DESEASE_GROUP=STROKE			
	GROUP	RESULTS		
		1-YES	2-NO	Total
	ASPIRIN	65 2.17 6.50 28.26	935 31.17 93.50 33.75	1000 33.33
	PLASEBO	165 5.50 8.25 71.74	1835 61.17 91.75 66.25	2000 66.67
	Total	230 7.67	2770 92.33	3000 100.00

Statistics for Table 2 of GROUP by RESULTS
Controlling for DESEASE_GROUP=STROKE

Statistic	DF	Value	Prob
Chi-Square	1	2.8842	0.0895
Likelihood Ratio Chi-Square	1	2.8596	0.0854
Continuity Adj. Chi-Square	1	2.6422	0.1041
Mantel-Haenszel Chi-Square	1	2.8832	0.0895
Phi Coefficient		-0.0310	
Contingency Coefficient		0.0310	
Cramer's V		-0.0310	

Fisher's Exact Test	
Cell (1,1) Frequency (F)	85
Left-sided Pr <= F	0.0507
Right-sided Pr >= F	0.9831
Table Probability (P)	0.0138
Two-sided Pr <= P	0.0943

Statistic	Value	ASE
Gamma	-0.1279	0.0747
Kendall's Tau-b	-0.0310	0.0175
Stuart's Tau-c	-0.0158	0.0088
Somers' D C R	-0.0175	0.0099
Somers' D R C	-0.0549	0.0310
Pearson Correlation	-0.0310	0.0175
Spearman Correlation	-0.0310	0.0175
Lambda Asymmetric C R	0.0000	0.0000
Lambda Asymmetric R C	0.0000	0.0000
Lambda Symmetric	0.0000	0.0000
Uncertainty Coefficient C R	0.0018	0.0021
Uncertainty Coefficient R C	0.0008	0.0009
Uncertainty Coefficient Symmetric	0.0011	0.0012

Odds Ratio and Relative Risks			
Statistic	Value	95% Confidence Limits	
Odds Ratio	0.7731	0.5741	1.0411
Relative Risk (Column 1)	0.7879	0.5974	1.0391
Relative Risk (Column 2)	1.0191	0.9979	1.0407

Sample Size = 3000

Chapter 3 Problem 16 Aspirin On HA and Strokes

The FREQ Procedure

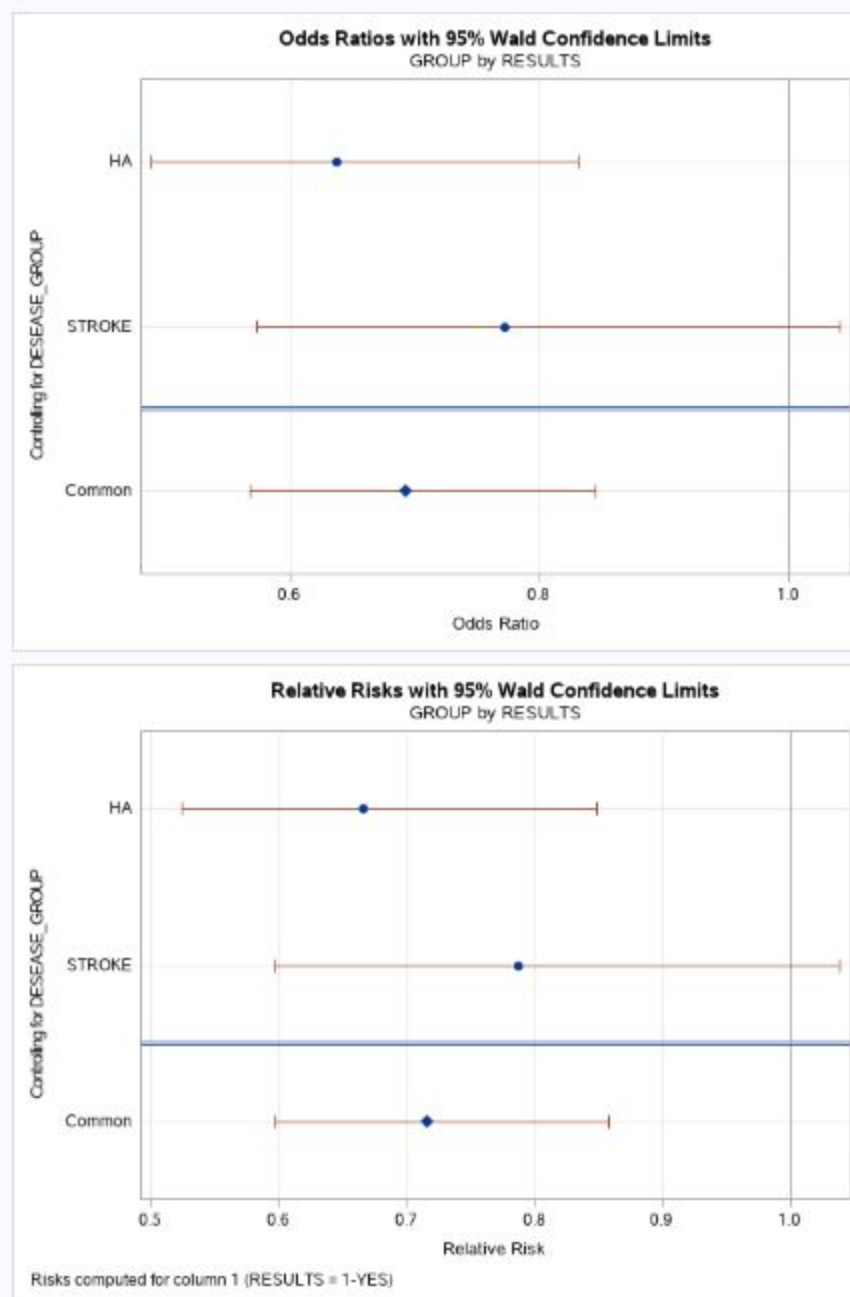
Summary Statistics for GROUP by RESULTS
Controlling for DESEASE_GROUP

Cochran-Mantel-Haenszel Statistics (Based on Table Scores)				
Statistic	Alternative Hypothesis	DF	Value	Prob
1	Nonzero Correlation	1	13.2675	0.0003
2	Row Mean Scores Differ	1	13.2675	0.0003
3	General Association	1	13.2675	0.0003

Common Odds Ratio and Relative Risks				
Statistic	Method	Value	95% Confidence Limits	
Odds Ratio	Mantel-Haenszel	0.8934	0.5689	0.8452
	Logit	0.8944	0.5697	0.8465
Relative Risk (Column 1)	Mantel-Haenszel	0.7160	0.5970	0.8588
	Logit	0.7166	0.5974	0.8595
Relative Risk (Column 2)	Mantel-Haenszel	1.0320	1.0156	1.0487
	Logit	1.0302	1.0139	1.0467

Breslow-Day Test for Homogeneity of the Odds Ratios	
Chi-Square	0.8974
DF	1
Pr > ChiSq	0.3435

Total Sample Size = 6000



Interpretation

Ho -> taking the Aspirin is independent from Heart Attack Prevention

Test for HA

Relative Risk for Aspirin (Column 1)=0.6667 -> means 66% risk to get HA compared to

to those who took placebo

95% CI = (0.5237 0.8487)

This means that with 95% confidence that Relative Risk value is in interval(0.5237 0.8487)

The confidence interval does not contain 1 we can reject the H_0 and conclude that taking Aspirin does not prevent Heart Attack.

H_0 -> taking the Aspirin is independent from Stroke Prevention

TEST for Stroke

Relative Risk for Aspirin (Column 1)=0.7879 -> means 78% risk to get Stroke compared to those who took placebo

95% CI = (0.5974 1.0391)

This means that with 95% confidence that Relative Risk value is in interval(0.5974 1.0391)

The confidence interval contains 1 therefore we fail to reject the H_0 and we conclude that there is a dependence between taking the Aspirin and Stroke prevention but there is not enough evidence that this dependents prevent Stroke.

CHAPTER 3 Problem 18

```
data STUDY;
input STUDY $ RESULTS $ NAME $ COUNT;

cards;
STUDY_1 DIED 1-MGSO4 100
STUDY_1 DIED 2-PLACEBO 155
STUDY_1 SURV 1-MGSO4 20
STUDY_1 SURV 2-PLACEBO 25
STUDY_2 DIED 1-MGSO4 150
STUDY_2 DIED 2-PLACEBO 150
STUDY_2 SURV 1-MGSO4 25
STUDY_2 SURV 2-PLACEBO 21
STUDY_3 DIED 1-MGSO4 200
STUDY_3 DIED 2-PLACEBO 240
STUDY_3 SURV 1-MGSO4 30
STUDY_3 SURV 2-PLACEBO 28

;
proc freq data=STUDY;
title 'Chapter 3 Problem 18 Study Effects Of Magnesium';
tables STUDY*NAME*RESULTS/all;
weight count;
run;
```

The FREQ Procedure

Frequency
Percent
Row Pct
Col Pct

Table 1 of NAME by RESULTS			
Controlling for STUDY=STUDY_1			
NAME	RESULTS		
	DIED	SURV	Total
1-MGSO4	100	20	120
	33.33	6.67	40.00
	83.33	16.67	
	39.22	44.44	
2-PLACEB	155	25	180
	51.67	8.33	60.00
	86.11	13.89	
	60.78	55.56	
Total	255	45	300
	85.00	15.00	100.00

Statistics for Table 1 of NAME by RESULTS
Controlling for STUDY=STUDY_1

Statistic	DF	Value	Prob
Chi-Square	1	0.4357	0.5092
Likelihood Ratio Chi-Square	1	0.4319	0.5111
Continuity Adj. Chi-Square	1	0.2451	0.6205
Mantel-Haenszel Chi-Square	1	0.4343	0.5099
Phi Coefficient		-0.0381	
Contingency Coefficient		0.0381	
Cramer's V		-0.0381	

Fisher's Exact Test	
Cell (1,1) Frequency (F)	100
Left-sided Pr <= F	0.3084
Right-sided Pr >= F	0.7960
Table Probability (P)	0.1044
Two-sided Pr <= P	0.5139

Statistic	Value	ASE
Gamma	-0.1071	0.1613
Kendall's Tau-b	-0.0381	0.0584
Stuart's Tau-c	-0.0267	0.0410
Somers' D C R	-0.0278	0.0427
Somers' D R C	-0.0523	0.0801
Pearson Correlation	-0.0381	0.0584
Spearman Correlation	-0.0381	0.0584
Lambda Asymmetric C R	0.0000	0.0000
Lambda Asymmetric R C	0.0000	0.0000
Lambda Symmetric	0.0000	0.0000
Uncertainty Coefficient C R	0.0017	0.0052
Uncertainty Coefficient R C	0.0011	0.0033
Uncertainty Coefficient Symmetric	0.0013	0.0040

Odds Ratio and Relative Risks			
Statistic	Value	95% Confidence Limits	
Odds Ratio	0.8065	0.4255	1.5286
Relative Risk (Column 1)	0.9677	0.8763	1.0687
Relative Risk (Column 2)	1.2000	0.6988	2.0607

Sample Size = 300

Frequency Percent Row Pct Col Pct	Table 2 of NAME by RESULTS			
	Controlling for STUDY=STUDY_2			
	NAME	RESULTS		
		DIED	SURV	Total
	1-MGSO4	150 43.35 85.71 50.00	25 7.23 14.29 54.35	175 50.58
	2-PLACEB	150 43.35 87.72 50.00	21 6.07 12.28 45.65	171 49.42
	Total	300 86.71	46 13.29	346 100.00

Statistics for Table 2 of NAME by RESULTS
Controlling for STUDY=STUDY_2

Statistic	DF	Value	Prob
Chi-Square	1	0.3016	0.5829
Likelihood Ratio Chi-Square	1	0.3020	0.5826
Continuity Adj. Chi-Square	1	0.1528	0.6959
Mantel-Haenszel Chi-Square	1	0.3008	0.5834
Phi Coefficient		-0.0295	
Contingency Coefficient		0.0295	
Cramer's V		-0.0295	

Fisher's Exact Test	
Cell (1,1) Frequency (F)	150
Left-sided Pr <= F	0.3483
Right-sided Pr >= F	0.7602
Table Probability (P)	0.1084
Two-sided Pr <= P	0.6363

Statistic	Value	ASE
Gamma	-0.0870	0.1577
Kendall's Tau-b	-0.0295	0.0536
Stuart's Tau-c	-0.0200	0.0365
Somers' D C R	-0.0201	0.0365
Somers' D R C	-0.0435	0.0789
Pearson Correlation	-0.0295	0.0536
Spearman Correlation	-0.0295	0.0536
Lambda Asymmetric C R	0.0000	0.0000
Lambda Asymmetric R C	0.0000	0.0000
Lambda Symmetric	0.0000	0.0000
Uncertainty Coefficient C R	0.0011	0.0040
Uncertainty Coefficient R C	0.0006	0.0023
Uncertainty Coefficient Symmetric	0.0008	0.0029

Odds Ratio and Relative Risks			
Statistic	Value	95% Confidence Limits	
Odds Ratio	0.8400	0.4506	1.5658
Relative Risk (Column 1)	0.9771	0.8998	1.0612
Relative Risk (Column 2)	1.1633	0.6775	1.9972

Sample Size = 346

Frequency
Percent
Row Pct
Col Pct

Table 3 of NAME by RESULTS			
Controlling for STUDY=STUDY_3			
NAME	RESULTS		
	DIED	SURV	Total
1-MGSO4	200	30	230
	40.16	6.02	46.18
	86.96	13.04	
	45.45	51.72	
2-PLACEB	240	28	268
	48.19	5.62	53.82
	89.55	10.45	
	54.55	48.28	
Total	440	58	498
	88.35	11.65	100.00

Statistics for Table 3 of NAME by RESULTS
Controlling for STUDY=STUDY_3

Statistic	DF	Value	Prob
Chi-Square	1	0.8104	0.3680
Likelihood Ratio Chi-Square	1	0.8079	0.3687
Continuity Adj. Chi-Square	1	0.5778	0.4472
Mantel-Haenszel Chi-Square	1	0.8088	0.3685
Phi Coefficient		-0.0403	
Contingency Coefficient		0.0403	
Cramer's V		-0.0403	

Fisher's Exact Test	
Cell (1,1) Frequency (F)	200
Left-sided Pr <= F	0.2233
Right-sided Pr >= F	0.8509
Table Probability (P)	0.0742
Two-sided Pr <= P	0.4020

Statistic	Value	ASE
Gamma	-0.1250	0.1376
Kendall's Tau-b	-0.0403	0.0449
Stuart's Tau-c	-0.0258	0.0289
Somers' D C/R	-0.0260	0.0290
Somers' D R/C	-0.0627	0.0698
Pearson Correlation	-0.0403	0.0449
Spearman Correlation	-0.0403	0.0449
Lambda Asymmetric C/R	0.0000	0.0000
Lambda Asymmetric R/C	0.0087	0.0330
Lambda Symmetric	0.0069	0.0263
Uncertainty Coefficient C/R	0.0023	0.0050
Uncertainty Coefficient R/C	0.0012	0.0026
Uncertainty Coefficient Symmetric	0.0015	0.0034

Odds Ratio and Relative Risks			
Statistic	Value	95% Confidence Limits	
Odds Ratio	0.7778	0.4496	1.3458
Relative Risk (Column 1)	0.9710	0.9102	1.0358
Relative Risk (Column 2)	1.2484	0.7695	2.0256

Sample Size = 458

Chapter 3 Problem 18 Study Effects Of Magnesium

The FREQ Procedure

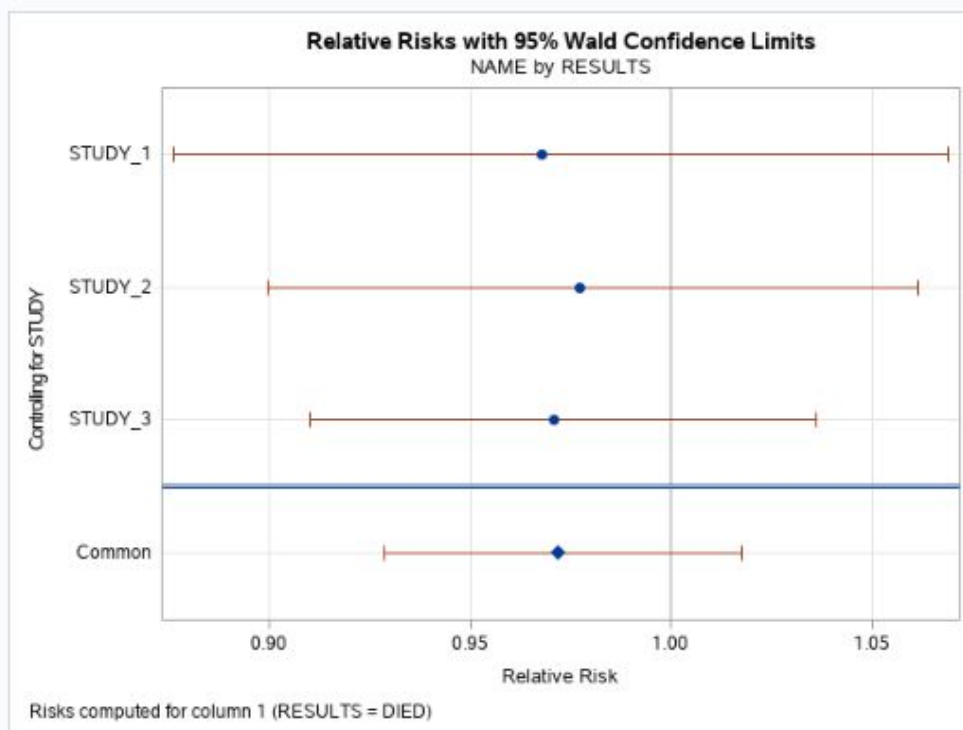
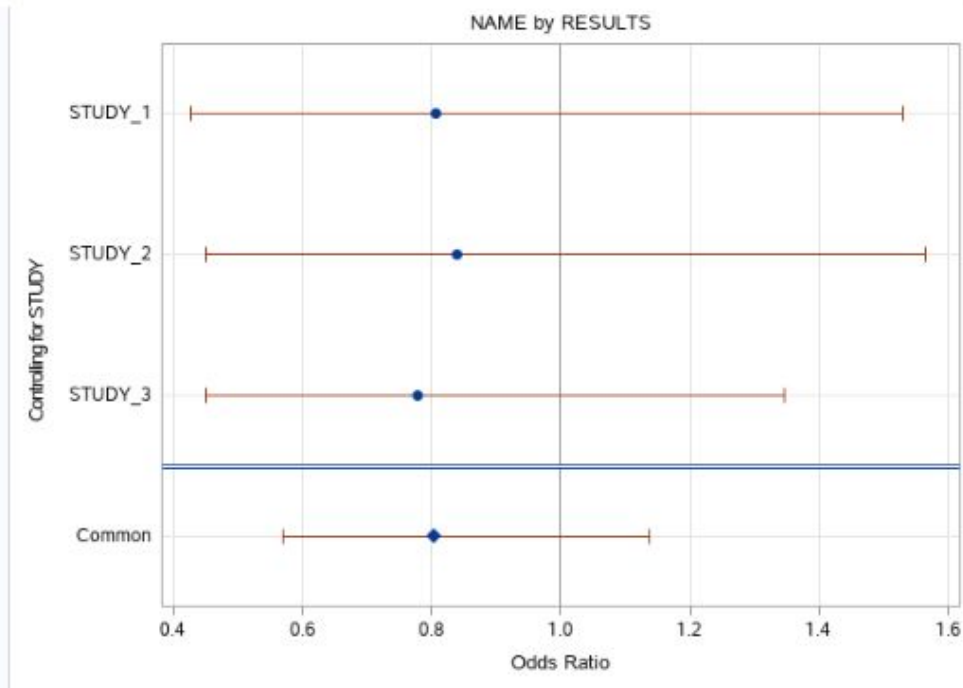
Summary Statistics for NAME by RESULTS
Controlling for STUDY

Cochran-Mantel-Haenszel Statistics (Based on Table Scores)				
Statistic	Alternative Hypothesis	DF	Value	Prob
1	Nonzero Correlation	1	1.5095	0.2192
2	Row Mean Scores Differ	1	1.5095	0.2192
3	General Association	1	1.5095	0.2192

Common Odds Ratio and Relative Risks				
Statistic	Method	Value	95% Confidence Limits	
Odds Ratio	Mantel-Haenszel	0.8050	0.5695	1.1379
	Logit	0.8050	0.5695	1.1378
Relative Risk (Column 1)	Mantel-Haenszel	0.9721	0.9288	1.0174
	Logit	0.9722	0.9291	1.0172
Relative Risk (Column 2)	Mantel-Haenszel	1.2070	0.8942	1.6294
	Logit	1.2068	0.8940	1.6289

Breslow-Day Test for Homogeneity of the Odds Ratios	
Chi-Square	0.0331
DF	2
Pr > ChiSq	0.9836

Total Sample Size = 1144



Interpretation

Breslow-Day Test for

Homogeneity of the Odds Ratios=0.9836 is not significant so we can combine the result of 3 studies.

Chi-Square for Study 1= 0.4357 p-value = 0.5092

Relative Risk for survival(Column 1)=1.2000 95% CI=(0.6988 2.0607)

Chi-Square for Study 2= 0.3016 p-value =0.5829

Relative Risk for survival(Column 1)=1.1633 95% CI=(0.6775 1.9972)

Chi-Square for Study 3= 0.8104 p-value = 0.3680

Relative Risk for survival(Column 1)=1.2484 95% CI=(0.7695 2.0256)

FROM Combined Studies :

Relative Risk Mantel-Haenszel for survival(Column 1)=0.9721 95% CI=(0.9288 1.0174) -> means that with 95% confidence the relative risk is inside the interval (0.9288 1.0174). Because the interval contains 1 we can conclude that the ratio is not significant for $\alpha=0.05$ Therefore we fail to reject H_0 and there is not enough evidence to conclude that $MgSO_4$ has improvement on survival.