

Objectives for Survey Results Module 1 – Basic Statistics

- **Number of respondents at baseline and follow-up**
 - **Number of participants in longitudinal dataset**
 - **Differences between baseline and longitudinal dataset**
- I. Number of respondents at baseline and follow-up
 - a. Baseline survey – 9175 respondents
 - b. Follow-up survey – 3700 respondents
 - II. Number of participants in longitudinal dataset
 - a. 596 participants provided unique identifiers in both the baseline and follow-up survey
 - III. Differences between baseline and longitudinal dataset

The tables below present information on those who responded at the baseline survey to those who were included in the longitudinal dataset for some selected variables which we will be using later in the demo.

		Baseline (n=9157)	Longitudinal (n=596)
Sex			
	female	3984 (44%)	282 (47%)
	male	4521 (49%)	310 (52%)
	missing	652 (7%)	4 (0.7%)
Age		32±10.1	33.78±10.3
Computer			
	Mac	1429 (16%)	84 (14%)
	PC	7080 (77%)	509 (85%)
	missing	648 (7%)	3 (0.5%)
Aptitude			
	math	3773 (41%)	287 (48%)
	verbal	4735 (52%)	305 (51%)
	missing	649 (7%)	4 (0.7%)
Your Handedness			
	righty	7582 (83%)	531 (89%)
	lefty	547 (6%)	44 (7%)
	ambidexterous	351 (4%)	18 (3%)

Objectives for Survey Results Module 2 – Factors Related to Mac vs PC Use

- Choose a study design to examine the association between math and verbal aptitude and Mac/PC use.
- Calculate the appropriate measure of association comparing math versus verbal aptitude and Mac/PC use.
- Construct your own analysis to study the association between handedness and Mac/PC use.

- I. Choose a study design
 - a. Exposure: Math and Verbal aptitude
 - b. Outcome: Mac/PC Use
 - c. Study design: Cross-sectional study
- II. Calculate the appropriate measure of association comparing the math and verbal aptitude and Mac/PC use.
 - a. Measure of association – Risk Ratio or Odds Ratio
 - b. Dropdown:
 - i. Statistics→ Epidemiology and Related→Tables for Epidemiologists→Cohort study risk-ratio etc.
 - ii. Case variable: macpc
 - iii. Exposed variable: aptitude
 - iv. On the options tab, check box for “Report odds ratio”
 - v. Submit
 - c. Command Window Syntax: `cs macpc aptitude,or`

	aptitude		
	Exposed	Unexposed	Total
Cases	39	45	84
Noncases	248	258	506
Total	287	303	590
Risk	.1358885	.1485149	.1423729
	Point estimate		[95% Conf. Interval]
Risk difference	-.0126263		-.0689729 .0437202
Risk ratio	.9149826		.6150247 1.361235
Prev. frac. ex.	.0850174		-.3612351 .3849753
Prev. frac. pop	.0413559		
Odds ratio	.9016129		.5690484 1.428626 (Cornfield)

	chi2(1) =	0.19	Pr>chi2 = 0.6609

People with stronger math abilities were about 9% less likely to use a Mac compared to people with stronger verbal abilities. The confidence interval for our risk ratio was 0.62 to 1.36

c. Command Window Syntax: `cs macpc lefty, or`

The risk ratio for this study was 0.94 and the odds ratio was 0.93. This shows that people who are left-handed were less likely to use a Mac compared to people who are right-handed.

Objectives for Survey Results Module 3 –Risk Factors for Sleep Difficulties

- Choose a study design to examine the association between tea/coffee consumption before bed and sleep difficulties.
- Calculate the appropriate measure of association comparing tea/coffee consumption before bed and sleep difficulties.
- Consider confounding and effect modification sex.
- Consider confounding and effect modification age.
- Construct your own analysis to study the association between handedness and sleep difficulties. Consider confounding and effect modification by sex.

- I. Choose a study design to examine the association between tea/coffee consumption before bed and sleep difficulties.
 - a. Study design: Cohort study
 - b. Exposure: Tea and coffee consumption two hours before bed
 - c. Outcome: Sleep difficulties that night
- II. Calculate the appropriate measure of association comparing tea/coffee consumption before bed and sleep difficulties.
 - a. Measure of association: Risk ratio
 - b. Dropdown:
 - i. Statistics→ Epidemiology and Related→Tables for Epidemiologists→Cohort study risk-ratio etc.
 - ii. Case variable: sleepdiff
 - iii. Exposed variable: caff2hrb4
 - iv. Submit.
 - c. Command Window Syntax: `cs sleepdiff caff2hrb4`

	caff2hrb4		
	Exposed	Unexposed	Total
Cases	19	81	100
Noncases	102	389	491
Total	121	470	591
Risk	.1570248	.1723404	.1692047
	Point estimate		[95% Conf. Interval]
Risk difference	-.0153156		-.0885836 .0579524
Risk ratio	.9111315		.5763827 1.440294
Prev. frac. ex.	.0888685		-.4402942 .4236173
Prev. frac. pop	.0181947		
+-----+-----+-----+-----+			
	chi2(1) =		0.16 Pr>chi2 = 0.6886

Those who drank tea or coffee before bed had 0.91 times the risk of sleep difficulties compared to those who did not drink tea or coffee.

III. Consider confounding and effect modification by sex.

a. Dropdown:

- i. Statistics→ Epidemiology and Related→Tables for Epidemiologists→Cohort study risk-ratio etc.
- ii. Case variable: sleepdiff
- iii. Exposed variable: caff2hrb4
- iv. Go to the “Options” tab; click the box next to “stratify on variables”; use the dropdown menu to select “male”
Note: Under “Within-stratum weights” the button next to “Use Mantel-Haenszel” should be automatically selected
- v. Submit.

b. Command Window Syntax: `cs sleepdiff caff2hrb4, by(male)`

male	RR	[95% Conf. Interval]		M-H Weight
no	.6689266	.3338178	1.34044	9.448399
yes	1.241935	.6697457	2.302969	7.068404
Crude	.9111315	.5763827	1.440294	
M-H combined	.9141471	.5777317	1.446458	
Test of homogeneity (M-H) chi2(1) = 1.721 Pr>chi2 = 0.1895				

The crude effect estimate is 0.911 while the Mantel-Haenszel adjusted risk ratio is 0.914. Since the crude and adjusted-risk ratios are so similar, we can conclude that there is not strong confounding by sex in our study.

Although our risk ratios for males and females seem different, there is no evidence of statistically significant effect modification by sex.

IV. Consider confounding and effect modification by age.

a. Dropdown:

- i. Statistics→ Epidemiology and Related→Tables for Epidemiologists→Cohort study risk-ratio etc.
- ii. Case variable: sleepdiff
- iii. Exposed variable: caff2hrb4
- iv. Go to the “Options” tab; click the box next to “stratify on variables”; use the dropdown menu to select “agecat”
Note: Under “Within-stratum weights” the button next to “Use Mantel-Haenszel” should be automatically selected
- v. Submit.

b. Command Window Syntax: `cs sleepdiff caff2hrb4, by(agecat)`

agecat	RR	[95% Conf. Interval]	M-H Weight	
18-29 yrs old	1.202553	.654413	2.209817	7.208
30-39 yrs old	.5083612	.1870783	1.381406	6.040404
40-49 yrs old	.8452381	.2120323	3.369427	1.976471
>=50 yrs old	1.305556	.3431283	4.967457	1.309091
Crude	.9111315	.5763827	1.440294	
M-H combined	.9143836	.5795498	1.442667	
Test of homogeneity (M-H) chi2(3) = 2.389 Pr>chi2 = 0.4957				

The crude risk ratio is 0.911 while the Mantel-Haenszel adjusted risk ratio is 0.914. Since the crude and adjusted-risk ratios are so similar, there is not strong confounding by age category in our study.

Despite the differences in the risk ratios by age category, there is no evidence of statistically significant effect modification by age category.

V. Construct your own analysis to study the association between handedness and sleep difficulties. Consider confounding and effect modification by sex.

a. Dropdown:

- Statistics→ Epidemiology and Related→Tables for Epidemiologists→Cohort study risk-ratio etc.
- Case variable: sleepdiff
- Exposed variable: lefty
- Submit

b. Command Window Syntax: `cs sleepdiff lefty`

	lefty		
	Exposed	Unexposed	Total
Cases	8	89	97
Noncases	36	440	476
Total	44	529	573
Risk	.1818182	.168242	.1692845
	Point estimate		[95% Conf. Interval]
Risk difference	.0135762		-.1047616 .131914
Risk ratio	1.080695		.5614644 2.080098
Attr. frac. ex.	.0746692		-.7810567 .5192533
Attr. frac. pop	.0061583		
chi2(1) = 0.05 Pr>chi2 = 0.8175			

People who are left-handed have a slightly higher (1.08 fold higher) risk of sleep difficulties compared people who are right-handed.

- c. Dropdown:
 - vi. Statistics→ Epidemiology and Related→Tables for Epidemiologists→Cohort study risk-ratio etc.
 - vii. Case variable: sleepdiff
 - viii. Exposed variable: lefty
 - ix. Go to the “Options” tab; click the box next to “stratify on variables”; use the dropdown menu to select “male”
Note: Under “Within-stratum weights” the button next to “Use Mantel-Haenszel” should be automatically selected
 - x. Submit.
- d. Command Window Syntax: `cs sleepdiff lefty, by(male)`

male	RR	[95% Conf. Interval]		M-H Weight
female	.9338374	.3691631	2.362241	3.918519
male	1.333333	.531464	3.345058	2.8
Crude	1.080695	.5614644	2.080098	
M-H combined	1.100331	.5725662	2.114564	
Test of homogeneity (M-H) chi2(1) = 0.288 Pr>chi2 = 0.5918				

Our results stratified by gender show slightly different results among males and females. Left-handed males have 1.33 times the risk of sleep difficulties compared to right-handed males while left-handed females have 0.93 times of the risk of sleep difficulties compared to right-handed males.

Objectives for Survey Results Module 4 –Risk Factors for Left and Right Handedness

- Choose a study design to examine the association between mother's age at birth of PH207x participant and handedness of the participant.
- Calculate the appropriate measure of association comparing the mother's age among those who are left-handed to those who are right-handed.
- Construct your own analysis to study the association between having a left-handed parent and child's handedness.

I. Choose a study design

- Exposure: Mother's age at birth of PH207x participant
- Outcome: Handedness of PH207x participant
- Study design: Case-control

II. Calculate the appropriate measure of association comparing the mother's age among those who are left-handed to those who are right-handed.

- Measure of association – Odds ratio
- Calculating the odds ratio in Stata
- Dropdown:
 - Statistics→ Epidemiology and Related→Tables for Epidemiologists→Case control odds ratio.
 - Case variable: lefty
 - Exposed variable: momagecat
 - Submit
- Command Window Syntax:

	Exposed	Unexposed	Total	Proportion Exposed
Cases	9	35	44	0.2045
Controls	57	474	531	0.1073
Total	66	509	575	0.1148
	Point estimate		[95% Conf. Interval]	
Odds ratio	2.138346		.8576737	4.829077 (exact)
Attr. frac. ex.	.5323488		-.1659446	.7929211 (exact)
Attr. frac. pop	.1088895			
+-----				
chi2(1) = 3.78 Pr>chi2 = 0.0519				

Mothers who are 35 years of age or older at the time of their child's birth have 2.14 times the odds of having a left-handed child compared to mothers who were younger than 35 at the time of their child's birth. We are 95% confident that the true odds ratio ranges from 0.86 to 4.83.

III. Construct your own analysis to study the association between having at least one left-handed parent and child's handedness.

```
. cc lefty parentlefty
```

	Exposed	Unexposed	Total	Proportion Exposed
Cases	6	38	44	0.1364
Controls	42	487	529	0.0794
Total	48	525	573	0.0838
	Point estimate		[95% Conf. Interval]	
Odds ratio	1.830827		.597326	4.708769 (exact)
Attr. frac. ex.	.4537988		-.6741276	.7876302 (exact)
Attr. frac. pop	.0618817			
+-----				
chi2(1) = 1.72 Pr>chi2 = 0.1900				

People with at least one left-handed parent have 1.83 times the odds of being left-handed compared to those without a left-handed parent.

Conclusions

- The appropriate measure of association depends on the type of exposure and outcome of interest, the type of data available and the study design used to obtain the data.
- In survey studies, one must always be concerned about issues of selection bias and generalizability.

Data Dictionary for Survey Dataset

Variable	Description	Values
board	In the past two weeks how often did you use the chat room for this course to post a question	"0" "2-3 times" "4 or more times" "Never" "Once"
male	Sex	0 no (female) 1 yes (male) . missing
degree	Highest level of education	1 pre-college / university degree 2 bachelor degree 3 masters degree 4 doctoral degree
precollege	Highest level of education is Pre-College/University Degree	0 no 1 yes . missing
masters	Highest level of education is Masters Degree	0 no 1 yes . missing
doctorate	Highest level of education is Doctoral Degree	0 no 1 yes . missing
macpc	Which type of computer do you use most of the time?	0 pc 1 mac . missing
aptitude	Which is stronger, your math aptitude or your verbal aptitude?	0 verbal 1 math . missing
caff2hrb4	Did you drink coffee or tea within two hours of bedtime yesterday?	0 no 1 yes . missing
sleepdiff	Did you have trouble sleeping last night?	0 no 1 yes . missing
shower	Do you face the shower head?	0 no 1 yes . missing
longhair	Do you consider your hair to be long?	0 no 1 yes . missing

Variable	Description	Values
facialhair	If you are a man, do you have a beard, mustache, or goatee?	0 no 1 yes . missing
agecat	Age of participant	1 18-29 yrs old 2 30-39 yrs old 3 40-49 yrs old 4 >=50 yrs old
momagecat	How old was your mother at your birth?	0 <35 yrs old 1 >=35 yrs old
lefty	Are you left-handed?	0 righty 1 lefty . missing
dadlefty	Is your father left-handed?	0 righty 1 lefty . missing
momlefty	Is your mother left-handed?	0 righty 1 lefty . missing
parentlefty	Is one (or both) of your parents left-handed?	0 No left-handed parents 1 Left-handed parent . missing
allhourscat	On average, how many hours per week did you spend on all aspects of this course?	0 0-7 hours 1 >=8 hours
hwkhourscat	On average, how many hours per week did you spend working on the homework assignments for this course?	0 0-2 hours 1 >=3 hours
comphrscat	For how many hours did you use your computer last night	0 0-1 hours 1 >=2 hours