

Looking at your project findings and presenting them clearly

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FoM
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... and add the bones

- introduction

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- methods

easiest: test run

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- findings

start properly here

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-

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- discussion

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-

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- conclusions

Your introduction

- Begin by clearly identifying the *subject area of interest*. You might want to include some key words from your title in the first few sentences to get it focused directly on topic at the appropriate level.
- Establish the *context* by providing a brief and balanced review of the pertinent published literature. The key is to summarise what was known about the problem *before* you did your study. Do not include very specific, lengthy explanations that you will probably discuss in greater detail later in the Discussion.
- State clearly the *purpose and /or hypothesis* that you investigated. State briefly *how* you approached the problem; and why you used a particular design. It is most usual to place the statement of purpose near the end of the Introduction, often as the topic sentence of the final paragraph.

Your methods

- Begin by describing the *population* you studied:
 - where
 - who (with response rates here?) or what
 - when

- Follow this be a description of *what you did* to them. Supposedly this is to allow readers to repeat your study should they want to; in practice it allows them to picture exactly what you did.
 - the level of detail is a matter of judgment
 - you may want to put questionnaires into an Appendix

- Add a section on '*analysis*'
 - statistical methods of description
 - statistical methods of analysis
 - power calculations

- Here is a good place to mention any *ethical review*

Tip; write down what you did when you did it otherwise you'll forget

Your findings

- a good way to start this section is by thinking about your Tables and Figures
- ... and then filling in the text

- start at the beginning, with descriptive tables

total participants	100
men: n(%)	75 (75%)
women: n(%)	25 (25%)
age: mean (sd)	35.4 (6.8)
months of employment: mean (sd)	18.2 (16.1)
aggression score: mean (sd)	35.6 (7.2)
styrene level: mean (sd)	0.36 (0.04)

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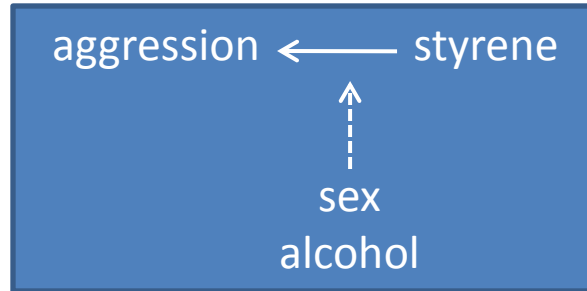
Thinking about your findings

remind
yourself of
your
conceptual
framework

outcome ← exposure
↑
confounder(s)
modifier(s)

remind yourself whether
your variables are
'continuous' or
'categorical'

Thinking about your findings: an example



- outcome = aggression, measured on an aggression scale from 0-100
- hence aggression = continuous variable
- categorising a continuous variable:
 - use a pre-determined, clinically validated cut-off ...
 - or, use your own data
 - observe distribution of aggression scale scores
 - top 25% = 'aggressive'

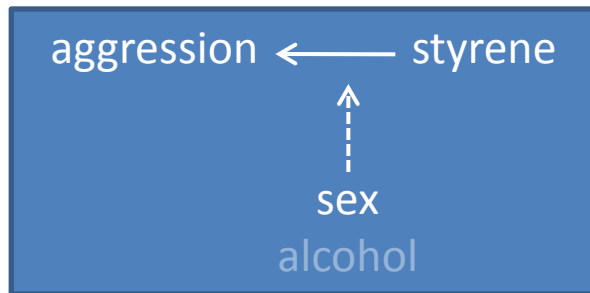
Thinking about your findings: using the 2x2 table

aggression ← styrene

	aggressive	not aggressive	
high styrene	20 (75%)	35 (47%)	55
low styrene	5 (25%)	40 (53%)	45
	25	75	100

- outcome = aggression
- exposure = styrene
- both are categories/have been categorised
- the odds of having a high styrene if you are aggressive are: $20/5 = 4$
- the odds of having a high styrene if you are not aggressive are: $35/40 = 0.9$
- the corresponding odds ratio is $4/0.9 = 4.4$

Thinking about your findings: next steps - stratification



	men	women	p
total participants	75	25	
age: mean (sd)			
months of employment: mean (sd)			
aggressive: n(%)			
styrene high: n(%)			

Thinking about your findings: stratified analysis with 2x2 tables

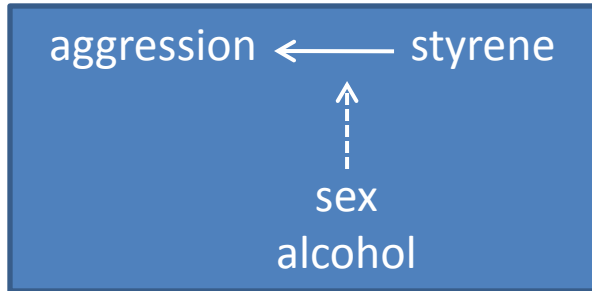
	men	
	aggressive	not aggressive
high styrene	16	25
low styrene	4	30
	20	55

- odds of high styrene in aggressive men : $16/20 = 4$
- odds of high styrene in not aggressive men: $25/30 = 0.9$
- the corresponding odds ratio is $4/0.9 = 4.4$

	women	
	aggressive	not aggressive
high styrene	4	9
low styrene	1	11
	5	20

- odds of high styrene in aggressive women : $4/1 = 4$
- odds of high styrene in not aggressive women: $9/11 = 0.8$
- the corresponding odds ratio is $4/0.8 = 4.9$

Thinking about your findings: several stratified analyses



- basic exposure:outcome
- stratified by potential confounding variables separately
- several strata simultaneously: regression

Some thoughts about statistics

- less haste, more speed: *describe your data*

- variables are either:

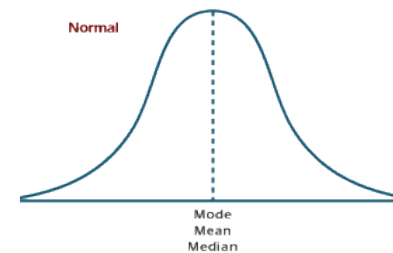
- categorical
- or continuous ...

- ... and need to be summarised appropriately:

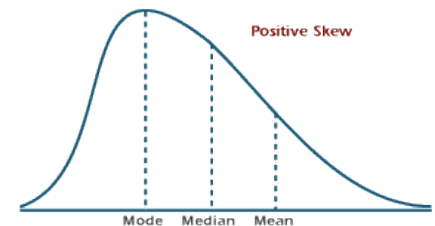
- categories: n(%)

- continuous variables are:

- normally distributed ('parametric'): mean (sd)
- or non-normally distributed ('non-parametric'): median (range or IQR)



men: n(%)	178 (79%)
age: mean (sd)	35.4 (6.8)
months of employment: mean (sd)	18.2 (16.1)



Some thoughts about statistics

- use tests of statistical significance sparingly
- and use the right ones: parametric vs non-parametric



William Gosset
1876-1937



Frank Wilcoxon
1892-1965



Karl Pearson
1857-1936

Some thoughts about statistics

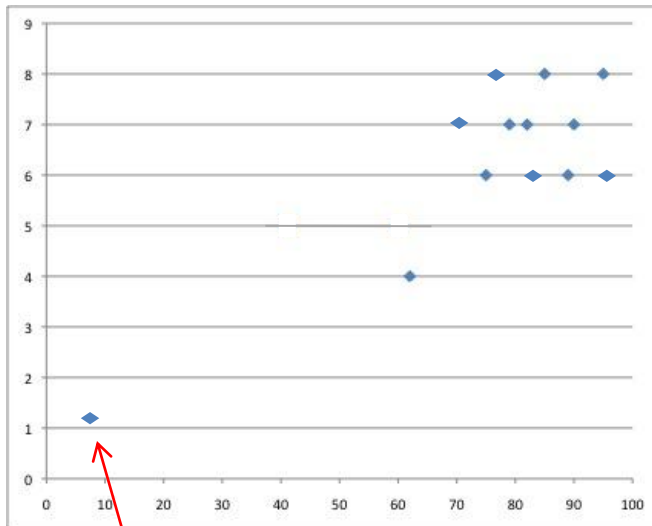
- use tests of statistical significance sparingly
 - and use the right ones: parametric vs non-parametric
 - remember that p values tell you no more than ‘what was the play of chance in your findings’
 - they tell you nothing about the size of any difference ...
 - ... but confidence intervals do
 - $p < 0.05$ is arbitrary
 - put in all your p values; we’re interested in $p = 0.06$
 - remember the potential dangers of multiple testing
 - don’t be dismayed by ‘negative’ findings
-
- if you really want a ‘positive’ p value, do a correlation



Ronald Fisher
1890-1962

Measuring agreement 1

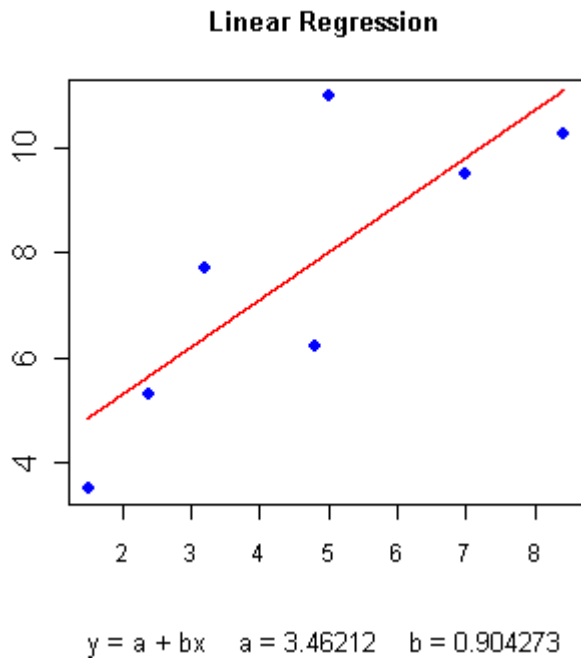
- correlation and regression analysis both deal with relationships among variables
- the correlation coefficient is a measure of linear association between two variables
- the 'closeness' of the association



this is an outlier ...

Measuring agreement 1

- correlation and regression analysis both deal with relationships among variables
- the correlation coefficient is a measure of linear association between two variables
- the 'closeness' of the association
- regression allows the *prediction* of one variable from another



Back to your findings

- ... consider 'exposure-response'

total participants	100
men: n(%)	75 (75%)
age: mean (sd)	35.4 (6.8)
months of employment: mean (sd)	18.2 (16.1)
aggression score: mean (sd)	35.6 (7.2)
styrene level: mean (sd)	0.36 (0.04)

Back to your findings

- ... consider 'exposure-response'

total participants	100
men: n(%)	75 (75%)
age: mean (sd)	35.4 (6.8)
months of employment: mean (sd)	18.2 (16.1)
aggression score: mean (sd)	35.6 (7.2)
styrene level:	
	high
	medium
	low

Back to your findings

- ... consider 'exposure-response'

total participants	100
men: n(%)	75 (75%)
age: mean (sd)	35.4 (6.8)
months of employment: mean (sd)	18.2 (16.1)
aggression score: very aggressive a bit aggressive not aggressive	
styrene level: mean (sd)	0.36 (0.04)

Back to your findings

- understand and consider some key terms:
 - odds ratio (case-control studies and cross-sectional surveys)
 - relative risk (cohort studies and experiments)

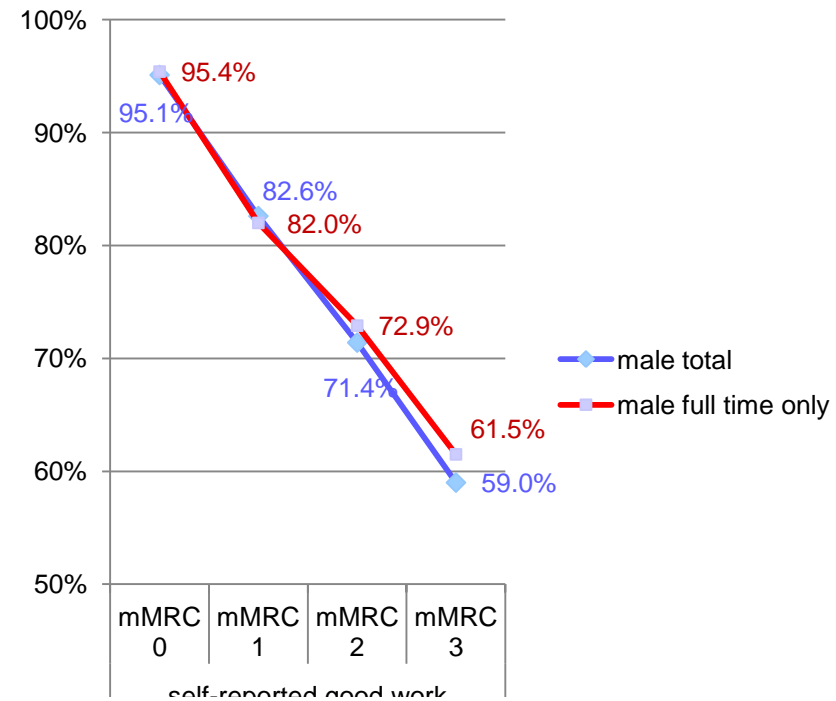
 - confounding
 - modification

 - multiple regression (continuous outcome)
 - logistic regression (binary outcome)

Back to your findings

- use Figures as well as Tables
- even, if you must, pie charts

Males in current employment	Full Time	%	Part Time	%	Total	%
Total	2039		187		2226	
Breathlessness score						
mMRC 0	1733	95.4%	149	94.3%	1893	95.1%
mMRC 1	223	82.0%	22	83.1%	242	82.6%
mMRC 2	51	72.9%	9	73.5%	55	71.4%
mMRC 3	32	61.5%	7	57.4%	36	59.0%



- Figures and Tables should 'stand alone'; the reader should be able to understand them without referring to the text

Your findings

- a good way to start this section is by thinking about your Tables and Figures
 - ... and then filling in the text
-
- you might want to use subheadings to divide the section into logical parts.
 - your text should:
 - for the most part accompany your tables/figures ...
 - ... and not repeat what is in them ...
 - ... but act more as a commentary
 - interpret what you see (you do the thinking – don't leave this to the reader)
 - OK to write text referring to information that is not displayed
-
- if you have many similar figures, select representative examples and put the rest in an Appendix
 - make comments on the results as they are presented, but save broader generalizations and conclusions for later

Your discussion

- a good way to start this section is by splitting it up:
 - summarise your main findings
 - interpret and explain them, one by one
 - put them into context – how do they compare with what others have found?
 - what are the weaknesses of your work – and how might these have affected its validity?
 - measurement error, confounding, biases, statistical uncertainty.
 - speculate on the reasons for unexpected findings.
 - don't be afraid of negative findings
- what are the implications for OH?
- are there remaining questions – how might these be studied?
- rounding off paragraphs: draw discussion to a close and make conclusions on your work.
 - these may be strongly positive, inconclusive or even negative

Some random thoughts on style

- paragraphs need to have:
 - a purpose
 - starting and finishing sentences
 - a link to the next one
- numbers
 - >10 are numerals (“14”)
 - ≤10 get spelled out (“six”) ...
 - ... unless they’re attached (“6mm”)
 - don’t start sentences (“Two hundred and forty eight employees responded ...”)
- people are ‘male and female’, adults are ‘men and women’
- “data” *are* plural
- infinitives don’t like to be split (much)
- “the frogs were put in a test tube”
- “we put the frogs in a test tube”
- embrace the Anglo-Saxon in you: ‘start’ for ‘commence’
- spellcheck with care: ‘sue’ and ‘use’

further reading

Design and related issues:

Schultz K and Grimes D. Lancet series 'Epidemiology'. Lancet 2005;365:1348 onwards

Statistics:

Essentials of Medical Statistics by Betty R. Kirkwood

Systematic reviews:

Systematic Reviews. eds Chalmers I and Altman D.

Testing instruments:

Health Measurement Scales. Streiner D and Norman G.

Format, style and tips for writing:

<http://unilearning.uow.edu.au/main.html>