

RESEARCH METHODS

Correlation

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RECAP: CORRELATION

- Non-experimental method
- Non-experimental methods investigate variables that exist among people irrespective of any researcher intervention
- Often using **correlation**, or by the investigation of existing group differences
- In these types of studies, no IV is manipulated
 - And, therefore, there are no IV's and DV's... only co-occurring variables

CORRELATIONAL RESEARCH

- ✓ Can establish generalisation outside of the lab
- ✓ Can generate ideas for further lab study
- ✓ Allows the examination of variables that may not be practical or ethical to study in the lab
- ✓ Variables are **MEASURED**, not manipulated

CORRELATIONAL DESIGN

Three components to correlation research:

1. Researcher measures one variable (X)
2. Researcher measures a second variables (X)
3. Researcher statistically determines whether (X) and (Y) are related

CORRELATIONAL DESIGN

- Important points about correlations:
 - Cause **CANNOT** be inferred from the existence of a strong correlation between variables
 - **Strength** is a measure of correlation, but **significance** assesses how unlikely such a correlation was to occur under the null hypothesis
 - This assessment depends on the size of N

EXAMPLE

Is there a relationship between levels of impulsivity and gambling behaviour?

Measure of (X)

Measure of (Y)

EXAMPLE

Is there a relationship between levels of impulsivity and gambling behaviour?

Not manipulating anything, simply measuring levels of each variable



EXAMPLE

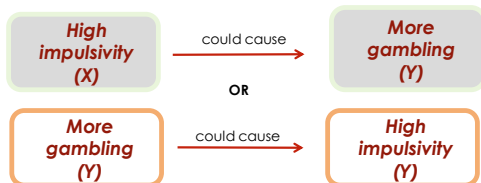
- So what can we say about these two variables?

We can say that levels of impulsivity and gambling are related,

or that they are NOT related

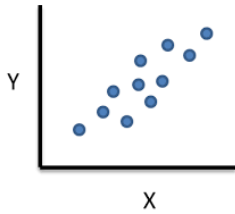
EXAMPLE

- What **can't** we say?
- We are not exploring whether one **causes** the other, so we cannot determine causality.



TYPES OF CORRELATION/RELATIONSHIP

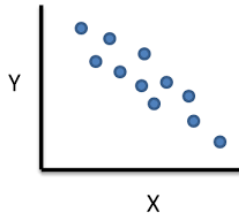
Positive Correlation



Higher scores on one variable are associated with higher scores on a second variable

TYPES OF CORRELATION/RELATIONSHIP

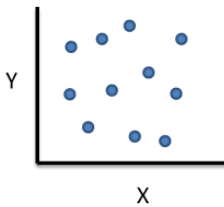
Negative Correlation



Higher scores on one variable are associated with lower scores on a second variable

TYPES OF CORRELATION/RELATIONSHIP

No Correlation



The two sets of scores are completely unrelated

HOW DO WE KNOW IF THEY ARE RELATED OR NOT???

- We carry out a statistical analysis (using SPSS)...

Pearson's Product Moment Correlation

This analysis provides us with two vital pieces of information:

1. A value for the **strength** of the relationship/correlation between the two variables
2. A value for the **significance** (probability) that these two variables are, in fact, related

MEASUREMENT OF CORRELATION

- The **strength** of the relationship between two variables is the degree to which one variable does tend to vary with the other
 - So, if one increases, does the other increase/decrease, too?
- Strength is expressed on a scale ranging from -1 (perfect negative correlation) to +1 (perfect positive correlation)
 - This final number is referred to as a **correlation coefficient** and is represented as r

MEASUREMENT OF CORRELATION





STUDY EXAMPLE

- After running a correlation analysis on data from a study measuring levels of impulsivity and gambling behaviours, the following values were obtained:

$$r = 0.74$$

$$p = .001$$

1. What is the DIRECTION of the relationship?
2. What is the STRENGTH of the relationship?
3. Are the two variables statistically related?



STUDY EXAMPLE 2

- After running a correlation analysis on data from a study measuring temperature and the sale of hot drinks, the following values were obtained:

$$r = -0.52$$

$$p = .042$$

1. What is the DIRECTION of the relationship?
2. What is the STRENGTH of the relationship?
3. Are the two variables statistically related?



SPSS PROCEDURE



SPSS PROCEDURE

- 1 • Analyze
- 2 • Correlate
- 3 • Bivariate

SPSS OUTPUT

Correlations

		X	Y
X	Pearson Correlation	1	-.805**
	Sig. (2-tailed)		.005
	N	10	10

$r = -.81$

$N = 10$

$p < .05$ OR $p = .005$

WRITING THE RESULTS SECTION

- The relationship between (X) and (Y) was investigated using Pearson product-moment correlation coefficient. There was a strong, negative correlation between the two variables, $r = -.81$, $n = 10$, $p < .01$, with high levels of (X) associated with lower levels of (Y)

CORRELATION 'FORMULA' APA STYLE

$r = ______, N = ______, p </> .05$

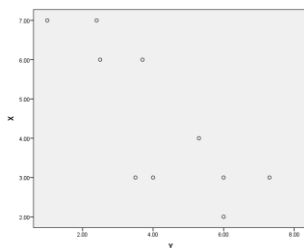
OR

$r = ______, N = ______, p = ______$

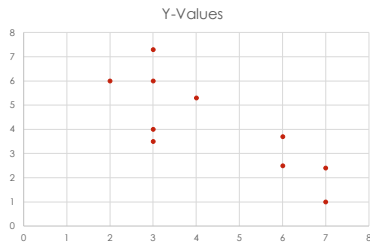
WHAT ELSE IS NEEDED?

- Scatterplot
- Powerful graphical technique for demonstrating a correlational relationship
- The extent to which pairs of readings are not scattered randomly on the diagram, but do form a consistent pattern, is a sign of the strength of the relationship

SPSS SCATTERPLOT

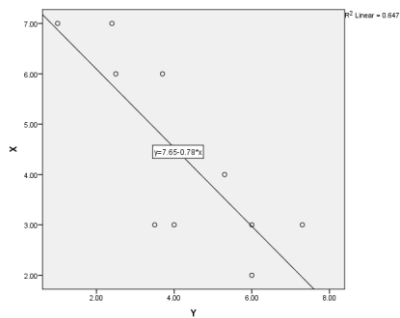


PPT SCATTERPLOT



SCATTERPLOTS

- Remember to label your axis!
 - Both X and Y – variables
- Label correctly according to APA style
 - *Figure 1.* Graph showing....
- Add a 'fit line'
 - Can be done easily on SPSS



NOW ITS YOUR TURN

1. Work through the worksheet provided to allow you to practice the correlation analysis (there are 4 examples) AND practice writing out the results with an appropriate interpretation.
2. Once comfortable with this, you can run the correlation analysis on your own study data and start (even finish) your results section with a scatterplot and correct interpretation.

REMEMBER: REPORTING CORRELATION STATISTICS

- When presenting the results of a correlation analysis you need to remember to state the **Pearson's statistic**, the **number of participants**, and the **probability/significance** (less than or more than .05)

$r =$, $n =$, $p (</>).05$

FINAL POINTS, HINTS AND TIPS

- You have been provided with the consent and debrief forms, and the two questionnaires
- When writing the MATERIALS section of your method, you **MUST** describe the two questionnaires in turn, and in as much detail as you can
- If you cannot remember how to do this, you will need to go back to lecture 3 and the information from workshop 3
 - I will also provide reliability results for you to put this into your description, too.
