

UNIVERSITY OF STRATHCLYDE
DEPARTMENT OF MATHEMATICS & STATISTICS

MM104: Statistics and Data Presentation Semester 2
MM107: Statistics and Data Presentation

PROJECT 4: HYPOTHESIS TESTS - χ^2 TESTS

Overview

In this project you will

1. Formulate a simple hypothesis.
2. Use Minitab to obtain contingency tables and bar charts and perform a chi square (χ^2) test for association.
3. Use your results to make conclusions regarding your hypothesis.
4. Use Word and PowerPoint for reports and presentations.
5. Further develop your presentation skills.

The Data Set

The data-set is based on several observations made on or related to children and their families involved in the Avon Longitudinal Study of Parents and Children (ALSPAC). Observations in the ALSPAC study are obtained through questionnaires, the responses being recorded as categorical variables.

Variable	Coded Response	Meaning
Time_Outside	0	Does not spend a lot of time outdoors
	1	Spends a lot of time outdoors
Short_Sighted	0	Not short sighted
	1	Short sighted
Eating_Disorder	0	Not at risk of developing an eating disorder
	1	At risk of developing an eating disorder
Psychotic_Experience	0	Did not have a psychotic experience when older
	1	Did have a psychotic experience when older
Vitamin_D	0	Does not have a good level of vitamin D
	1	Has a good level of vitamin D
Eczema	0	Does not have eczema
	1	Has eczema
Hayfever	0	Does not have hayfever
	1	Has hayfever
Cannabis	0	Mother did not smoke cannabis when pregnant
	1	Mother smoked cannabis when pregnant
Low_Birth_Weight	0	Baby did not have a low birth weight
	1	Baby had a low birth weight
Early_Bed	0	Had less than 10.5 hours sleep per night
	1	Had more than 10.5 hours sleep per night
Obese	0	Not recorded as obese
	1	Recorded as obese

Each group will work with one of the treatment group data sets as shown below:

Group Number	Topics
1	Vitamin D and Psychotic Experience
2	Cannabis and Low Birth Weight
3	Early Bed and Obesity
4	Time outside and short sighted
5	Eczema and Hayfever

Tasks

For each pair of variables you are expected to at least:

- Conduct background research on the survey and the variables you have been assigned.
- Formulate a hypothesis. The aim is to determine whether or not there is an association between the two variables. Think about the variables you have been given and whether or not you would expect an association, based on your background research, and this should be stated in your aims. You should then write down your hypothesis about the association in

the methods section. You should clearly state the null hypothesis (H_0) and the alternative hypothesis (H_1).

- Obtain one contingency table and one bar chart.
- Undertake a chi square test for association at the 5% significance level.
- Interpret your results in the context of the scenario.
- Test your assumptions of your test.
- If appropriate calculate the contribution to chi squared test statistic and interpret the result.

Report and Presentation

Your Word report should be at least 3 to 4 pages, and at least 750 words (excluding title page and references). Your report should have sections which correspond to the sections in your PowerPoint presentation as well as a references section. Your PowerPoint presentation should be 5-6 minutes.

Remember: the first or second page should contain a declaration section. This should list the names of all group members and sentence outlining each person's contribution to the project. Each person should sign this sheet electronically.