PSYC2012 – Statistics & Research Methods for Psychology

Unit of Study Code: PSYC2012

Coordinator: Dr Margaret Charles
Contact: Office: Room 452 Brennan MacCallumbuilding
Phone: 9351 3354
E-mail: margretc@psych.usyd.edu.au

Format of Unit: 2 x 1 hour lectures/week x 13 weeks (Statistics)
1 x 1 hour lecture x 6 weeks (alternate weeks: Research Methods)
1 x 1 hour tutorial/week x 12 weeks
1 x 1 hour computer tutorial x 6 weeks (alternate weeks)

Tutorial sizes: maximum of 20 students per group

You need to attend both your weekly statistics (STA) tutorial and your fortnightly computer (COM) tutorial. You will be allocated to either EVEN or ODD weeks for your computer tutorial (and your Research Methods lecture) by the University Timetabling Unit. Tutorials (and Research Methods lectures) commence in week 2, an EVEN week.

Credit Point Value: 6 Credit Points

Prerequisite: 12 credit points of First Year Psychology including PSYC 1001 and PSYC 1002

Assessment: 30% Tutorial Tests
Held in weekly tutorials in Week 4, Week 8 and Week 12
Week 4, 26 March – 30 March, 5% of the total mark
Week 8, 30 April – 4 May, 12.5% of the total mark
Week 12, 28 May – 1 June, 12.5% of the total mark

20% Midsemester examination (computerized, multiple choice)
Held in weekly tutorial in Week 9, 7 May – 11 May

10% Group project, 1,000 words
Due week 13, Friday 8 June

5% Research methods test

35% Final examination (multiple choice)
Final grade will be determined on the basis of total scaled marks across the various assessments, ALL of which are compulsory.
Unit of study general description:

In this unit of study you will be introduced to some of the basic concepts of statistics and statistical inference, and research design, as applied in psychological research. The aim of the course is to develop your ability to understand the published research literature, to design and plan research questions with a clear idea of how to test the questions of interest, and to become critical consumers of any sort of statistical information. Your introduction to the computer package SPSS is designed with the goal of making you informed users of the technology. To encourage you to maintain the required level of application, assessments will be carried out regularly.

Teaching outcomes:

Students will be expected to:
• calculate and interpret descriptive statistics such as measures of central tendency and variability
• demonstrate understanding of graphical and tabular representations of data, and be able to use statistical tables (which will be provided)
• demonstrate the ability to formulate and carry out significance tests for statistical hypotheses appropriate to a variety of research situations
• be able to compute and interpret confidence intervals and other effect size indices
• understand the limitations of, and possibility of errors in, statistical inference
• critically evaluate published research
• be able to carry out appropriate statistical tests on computer using SPSS, as taught in tutorials, and interpret the output accordingly
• apply and synthesise the material covered in a group research project which involves the analysis, reporting and interpretation of data

Evidence of learning:

Assessment is continuous and varied to enable students to demonstrate their understanding of all aspects of the unit of study. Written assessments will be open book and will test the student's ability to carry out various procedures and to report the results appropriately. The subject matter of each of the written tests, as detailed under Assessments (above), will be specified in lectures and on the unit of study website. The group project is to encourage the ability to work in groups and pool knowledge and abilities to produce a superior report of research and analysis, including a critique of published research. The examinations (midsemester and final) are closed book, and consist of multiple choice questions. The midsemester examination is computerised and is held in tutorials; the end of semester examination is held under normal examination conditions.

SYLLABUS

Descriptive statistics: Measures of central tendency and variability. Effects of transformation on a set of scores. Finding areas under the normal curve.

Inferential statistics: Formulating hypotheses for tests of statistical significance for a single mean, using z and t-tests; for 2 related means and for 2 independent means using t-tests. Analysis of variance and follow-up tests for tests about means with two or more groups. Looking at relationships between two continuous variables: correlation. Factors affecting correlation. Testing correlation coefficients for statistical significance. Simple linear regression. Categorical data: tests for frequency data using the chisquare statistic.

Research methods: understanding the problems of designing experiments to answer specific questions, and limitations in the conclusions that can be drawn.
TIMETABLE

<table>
<thead>
<tr>
<th>WEEK</th>
<th>STATISTICS LECTURES</th>
<th>RESEARCH METHODS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Descriptive statistics: central tendency and variability</td>
<td>No lecture</td>
</tr>
<tr>
<td>2</td>
<td>Standard deviation, z scores, normal distribution</td>
<td>Variables and Relationships</td>
</tr>
<tr>
<td>3</td>
<td>Hypothesis testing; sampling distribution of the mean</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Hypothesis testing: t test for a single mean</td>
<td>Research Designs</td>
</tr>
<tr>
<td>5</td>
<td>Parameter estimation; statistical power</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>t-tests for related and independent samples</td>
<td>Internal and External Experimental Validity</td>
</tr>
<tr>
<td>7</td>
<td>Analysis of variance - one-way</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Analysis of variance - two way</td>
<td>Artifacts and bias in behavioural research</td>
</tr>
<tr>
<td>9</td>
<td>Correlation</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Simple Linear Regression</td>
<td>Controlling Extraneous Variables</td>
</tr>
<tr>
<td>11</td>
<td>Chi-square tests for categorical data</td>
<td>Applications: Reading Research</td>
</tr>
<tr>
<td>12</td>
<td>Applications: choosing appropriate tests</td>
<td>Critically</td>
</tr>
<tr>
<td>13</td>
<td>Overview and revision</td>
<td></td>
</tr>
</tbody>
</table>

EQUIPMENT

Students will need a calculator, to be brought to all tutorials. The calculator should have statistical functions; the calculators used in secondary school mathematics courses will be quite suitable. Students will also need to purchase a CD-R (writeable CD) or USB memory stick for saving assignment and tutorial data.

TEXT

NOTE: Two versions of the Howell text are available, only one of which is needed. For those students who have done no statistics before (Psych. 1 not included) and are apprehensive, the ‘Fundamentals’ book is recommended. For those who have some statistical training, the ‘Methods’ book is more advanced and a valuable reference for further study in Psychology.

EITHER

OR

REFERENCES

The following have been texts in previous years and may be useful for supplementary reading and exercises:
SOFTWARE

Purchasing SPSS software is not essential for PSYC2012, but is recommended for students who intend to continue with the study of Psychology. There are 2 versions that can be purchased at the Co-Op bookshop: the Graduate pack comes with a 4 year licence and is a fully-functioning version of SPSS (recommended). The Student version is a cut-down version that is less expensive and is suitable for PSYC2012, but not for 3rd year and beyond. For students who are uncertain about whether they will continue, the Student version can be purchased very cheaply as a package with the text. There are Mac and PC versions of SPSS, but NOTE that at present the Mac version is not suitable for new Mac computers with the Intel chip. SPSS has promised a compatible version later this year.