



PSYC718

Advanced Research Design and Statistics

S1 Day 2015

Department of Psychology

Contents

<u>General Information</u>	2
<u>Learning Outcomes</u>	2
<u>Assessment Tasks</u>	3
<u>Delivery and Resources</u>	6
<u>Policies and Procedures</u>	6
<u>Graduate Capabilities</u>	8

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General Information

Unit convenor and teaching staff

Lecturer and Convenor

Naomi Sweller

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Contact via 9850 8084

C3A 512

Credit points

4

Prerequisites

Admission to MRes

Corequisites

Co-badged status

PSY418

Unit description

This unit is designed as preparation for honours projects and to help equip students for research careers. The unit focuses on practical issues of quantitative data analysis. Most topics are dealt with in the context of SPSS. Topics include sample size and statistical power analysis, data management in SPSS and more advanced methods specifically applicable to research in psychology.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

Learning Outcomes

On successful completion of this unit, you will be able to:

1. Understand how to calculate both prospective sample size requirements and retrospective: a) Be able to estimate sample size needed for simple research designs b) Be able to calculate statistical power available at the end of a study for simple research designs
2. Understand the impact of several aspects of research design on sample size requirements and statistical power. a) Between vs within-subject design b) Effects of between-subject variance and instrument responsiveness

3. Understand how abstract concepts are operationalised in statistical terms in psychological research.
4. Understand the application and interpretation of several advanced statistical methods applicable to research in psychology.
5. Gain an enhanced practical understanding of statistical software use in psychological research.

Assessment Tasks

Name	Weighting	Due
Online Quizzes	10%	Weeks 4 and 10
Midsession exam	20%	Week 7
Final exam	50%	Examination period
Research Proposal	20%	5pm Friday 29th May

Online Quizzes

Due: **Weeks 4 and 10**

Weighting: **10%**

Two quizzes due by 5pm Monday at the start of weeks 4 and 10 will each open one week before they are closed and each account for 5% of the unit assessment. If a quiz cannot be undertaken for reasons that qualify under the special consideration rules, the value of the remaining quiz will be inflated proportionately to total 10%. No extensions will be granted beyond midnight of the Thursday prior to that week's lecture, as we will be going through the answers to each quiz in the following lecture. Each quiz must be completed individually by each student. *These tasks will assist with Learning Outcomes 1, 2, 3, 4 and 5.*

On successful completion you will be able to:

- 1. Understand how to calculate both prospective sample size requirements and retrospective: a) Be able to estimate sample size needed for simple research designs b) Be able to calculate statistical power available at the end of a study for simple research designs
- 2. Understand the impact of several aspects of research design on sample size requirements and statistical power. a) Between vs within-subject design b) Effects of between-subject variance and instrument responsiveness
- 3. Understand how abstract concepts are operationalised in statistical terms in psychological research.

- 4. Understand the application and interpretation of several advanced statistical methods applicable to research in psychology.
- 5. Gain an enhanced practical understanding of statistical software use in psychological research.

Midsession exam

Due: **Week 7**

Weighting: **20%**

This will be a 2-stage exam, with a team-work component. The exam will be a mixture of multiple choice and “fill in the blank” short answer questions. The procedure is such that you will first sit the exam individually, and then immediately afterwards in the same time slot you will do the exam again in groups of four. The exams will then be graded such that 90% of the score comes from the individual attempt, and 10% from the group attempt, unless the individual attempt is better than the group attempt, in which case the student will get 100% of their score from the individual attempt.

I will be allocating all students to groups. I will post the group allocations to iLearn in the week of the exam. All allocations will be completely random and based on a random number generator.

If a student misses the exam due to illness or other unavoidable circumstances they can sit a supplementary exam which will contain only an individual component, with no group component (following University guidelines that the supplementary exam does not need to be the same format as the original exam). If a student has special circumstances such as the need for an individual testing room, or a longer testing time, they will sit the individual exam at the same time as the rest of the group, but in their own room. They may start the exam earlier to enable them to finish the individual component with enough time to make their way to the group exam room to complete the group component of the assessment.

This task will assist with Learning Outcomes 1, 2, 3 and 4.

On successful completion you will be able to:

- 1. Understand how to calculate both prospective sample size requirements and retrospective: a) Be able to estimate sample size needed for simple research designs b) Be able to calculate statistical power available at the end of a study for simple research designs
- 2. Understand the impact of several aspects of research design on sample size requirements and statistical power. a) Between vs within-subject design b) Effects of between-subject variance and instrument responsiveness
- 3. Understand how abstract concepts are operationalised in statistical terms in psychological research.
- 4. Understand the application and interpretation of several advanced statistical methods

applicable to research in psychology.

Final exam

Due: **Examination period**

Weighting: **50%**

This is a 2 hour closed book examination. The final examination may be based on any of the material covered in the unit. This will be held during the examination period, exact date will be advised closer to the time. *This task will assist with Learning Outcomes 1, 2, 3 and 4.*

On successful completion you will be able to:

- 1. Understand how to calculate both prospective sample size requirements and retrospective: a) Be able to estimate sample size needed for simple research designs b) Be able to calculate statistical power available at the end of a study for simple research designs
- 2. Understand the impact of several aspects of research design on sample size requirements and statistical power. a) Between vs within-subject design b) Effects of between-subject variance and instrument responsiveness
- 3. Understand how abstract concepts are operationalised in statistical terms in psychological research.
- 4. Understand the application and interpretation of several advanced statistical methods applicable to research in psychology.

Research Proposal

Due: **5pm Friday 29th May**

Weighting: **20%**

This is a written report of 1000 words to be formatted like the aims/method/analysis section of a grant proposal. Students are required to outline briefly the background and aims / hypotheses of a proposed study, and the method to be employed. All constructs to be measured should be clearly operationalised. Students should then describe a plan of analysis including: 1) the statistical tests to be used and 2) the variables (independent, dependent, covariate, observed, latent etc., as appropriate) to be entered into the analyses. The project can either be one you are planning to carry out in the second year of your MRes, or can be another of your choosing, but should be feasible and based on real literature. The statistical tests used can be either techniques taught in PSYC718 or techniques learnt elsewhere, whichever is most appropriate to your design. No actual analysis is required. The report is due at 5p.m. Friday 29th May through the turnitin portal on iLearn. You will receive feedback on Friday 12th June. *This task will assist with Learning Outcomes 3 and 4.*

Penalties will be levied for late submission of the assignment: Late submission of the research proposal will attract a penalty of 5% of the maximum mark for every day late. In other words, the

assignment is worth 20%, so a penalty of $5\% \times 20 = 1$ will be applied. 1 mark is subtracted from whatever the student received for the report for each day late.

Requests for extensions for assignments are granted by the Student Centre.

Writing over the allocated word limit similarly attracts a penalty of 5% of the maximum mark, which will be deducted for every 100 words over the stated word limit. Therefore, for Research Proposal (worth 20% of the overall assessment) if the assignment is 100 words over the limit in total (i.e. 1100 words) then $5\% \times 20 = 1$ mark will be subtracted from whatever the student received for the assignment.

On successful completion you will be able to:

- 3. Understand how abstract concepts are operationalised in statistical terms in psychological research.
- 4. Understand the application and interpretation of several advanced statistical methods applicable to research in psychology.

Delivery and Resources

Lectures will involve demonstrations of SPSS procedures, using various examples. Students are encouraged to bring their own laptop with SPSS installed, but this is not required. Theoretical issues will also be discussed during the lectures.

While there will be Echo recordings, the lectures are designed for face-to-face format. Due to the interactive nature of the lectures in which students are encouraged to ask questions as we go, on occasion additional notes may be written on a whiteboard, or discussed verbally. There is no guarantee these will be captured by the recording. Further, if a recording fails, no replacement recordings will be uploaded as this unit is designed for internal mode only, with the assumption that students are able to attend classes.

The only exceptions to this are Weeks 4 and 6, which will be recorded lectures uploaded to iLearn for you to listen to in your own time, and Week 7 which will be the mid-session exam. In Week 4 I will be overseas for a conference, while Week 6 is the Good Friday public holiday.

Practical exercises will be set each week for students to undertake in their own time. The following week there will be a demonstration session in addition to the lecture in which the lecturer will show (live) how they would approach the exercises. Students are encouraged to bring their own laptop computers to demonstration sessions to follow-along. Questions are encouraged during this session in particular.

Students are expected to complete readings prior to attending the lecture, and they are expected to participate in class discussions.

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](#). Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

Assessment Policy <http://mq.edu.au/policy/docs/assessment/policy.html>

Grading Policy <http://mq.edu.au/policy/docs/grading/policy.html>

Grade Appeal Policy <http://mq.edu.au/policy/docs/gradeappeal/policy.html>

Grievance Management Policy http://mq.edu.au/policy/docs/grievance_management/policy.html

Disruption to Studies Policy http://www.mq.edu.au/policy/docs/disruption_studies/policy.html *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

In addition, a number of other policies can be found in the [Learning and Teaching Category](#) of Policy Central.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/support/student_conduct/

Results

Results shown in *iLearn*, or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit ask.mq.edu.au.

Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

Student Services and Support

Students with a disability are encouraged to contact the [Disability Service](#) who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

IT Help

For help with University computer systems and technology, visit <http://informatics.mq.edu.au/help/>.

When using the University's IT, you must adhere to the [Acceptable Use Policy](#). The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

PG - Capable of Professional and Personal Judgment and Initiative

Our postgraduates will demonstrate a high standard of discernment and common sense in their professional and personal judgment. They will have the ability to make informed choices and decisions that reflect both the nature of their professional work and their personal perspectives.

This graduate capability is supported by:

Learning outcomes

- 1. Understand how to calculate both prospective sample size requirements and retrospective: a) Be able to estimate sample size needed for simple research designs b) Be able to calculate statistical power available at the end of a study for simple research designs
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Assessment tasks

- Online Quizzes
- Midsession exam
- Final exam
- Research Proposal

PG - Discipline Knowledge and Skills

Our postgraduates will be able to demonstrate a significantly enhanced depth and breadth of

knowledge, scholarly understanding, and specific subject content knowledge in their chosen fields.

This graduate capability is supported by:

Learning outcomes

- 1. Understand how to calculate both prospective sample size requirements and retrospective: a) Be able to estimate sample size needed for simple research designs b) Be able to calculate statistical power available at the end of a study for simple research designs
- 2. Understand the impact of several aspects of research design on sample size requirements and statistical power. a) Between vs within-subject design b) Effects of between-subject variance and instrument responsiveness
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PG - Critical, Analytical and Integrative Thinking

Our postgraduates will be capable of utilising and reflecting on prior knowledge and experience, of applying higher level critical thinking skills, and of integrating and synthesising learning and knowledge from a range of sources and environments. A characteristic of this form of thinking is the generation of new, professionally oriented knowledge through personal or group-based critique of practice and theory.

This graduate capability is supported by:

Learning outcomes

- 1. Understand how to calculate both prospective sample size requirements and retrospective: a) Be able to estimate sample size needed for simple research designs b) Be able to calculate statistical power available at the end of a study for simple research designs

- 2. Understand the impact of several aspects of research design on sample size requirements and statistical power. a) Between vs within-subject design b) Effects of between-subject variance and instrument responsiveness
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PG - Research and Problem Solving Capability

Our postgraduates will be capable of systematic enquiry; able to use research skills to create new knowledge that can be applied to real world issues, or contribute to a field of study or practice to enhance society. They will be capable of creative questioning, problem finding and problem solving.

This graduate capability is supported by:

Learning outcomes

- 1. Understand how to calculate both prospective sample size requirements and retrospective: a) Be able to estimate sample size needed for simple research designs b) Be able to calculate statistical power available at the end of a study for simple research designs
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PG - Effective Communication

Our postgraduates will be able to communicate effectively and convey their views to different social, cultural, and professional audiences. They will be able to use a variety of technologically supported media to communicate with empathy using a range of written, spoken or visual formats.

This graduate capability is supported by:

Learning outcomes

- 1. Understand how to calculate both prospective sample size requirements and retrospective: a) Be able to estimate sample size needed for simple research designs b) Be able to calculate statistical power available at the end of a study for simple research designs
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