



PSY 418

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>	5
<u>Policies and Procedures</u>	6
<u>Graduate Capabilities</u>	7

Disclaimer

Macquarie University has taken all reasonable measures to ensure the information in this publication is accurate and up-to-date. However, the information may change or become out-dated as a result of change in University policies, procedures or rules. The University reserves the right to make changes to any information in this publication without notice. Users of this publication are advised to check the website version of this publication [or the relevant faculty or department] before acting on any information in this publication.

General Information

Unit convenor and teaching staff

Lecturer and Convenor

Naomi Sweller

naomi.sweller@mq.edu.au

Contact via 9850 8084

C3A 512

Credit points

3

Prerequisites

Corequisites

PSY490 or PSY495

Co-badged status

PSYC718

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	40%	Week 7
Final exam	50%	Examination period

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: **40%**

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.

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

Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

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
- 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

- Online Quizzes
- Midsession exam
- Final exam

Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

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
- 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

- Online Quizzes
- Midsession exam
- Final exam

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to

critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

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
- 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

- Online Quizzes
- Midsession exam
- Final exam

Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

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

- 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

- Online Quizzes
- Midsession exam
- Final exam

Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

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
- 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

- Online Quizzes
- Midsession exam
- Final exam