



PSYC718

Advanced Research Design and Statistics

S1 Day 2019

Department of Psychology

Contents

<u>General Information</u>	2
<u>Learning Outcomes</u>	2
<u>General Assessment Information</u>	3
<u>Assessment Tasks</u>	4
<u>Delivery and Resources</u>	5
<u>Unit Schedule</u>	6
<u>Policies and Procedures</u>	7
<u>Graduate Capabilities</u>	9

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

4 First Walk (C3A) 512

Credit points

4

Prerequisites

Admission to MRes

Corequisites

Co-badged status

PSY 418

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:

- 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
- 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
- Understand how abstract concepts are operationalised in statistical terms in

psychological research.

Understand the application and interpretation of several advanced statistical methods applicable to research in psychology.

Gain an enhanced practical understanding of statistical software use in psychological research, with a focus on understanding the syntax required to carry out analyses and interpreting output.

General Assessment Information

Final examination information

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.

Students who are unable to sit an examination must advise Ms Donna Keeley (9850 8113, ask@mq.edu.au) and submit an Application for Special Consideration form (supporting documentation from a medical or health care professional clearly stating the reasons for the absence from the exam must be attached to your submission). All documentation must be submitted to Donna Keeley no later than 24 hours after the date of the exam. The only exception to not sitting an examination at the designated time is because of documented illness or unavoidable disruption. In these circumstances you may wish to consider applying for Special Consideration.

If a Supplementary Examination is granted as a result of the Special Consideration process, the examination will be held one week after the original examination date. The format of a supplementary examination is at each unit convener's discretion and is subject to change from the original final examination.

Supplementary Exams are only offered to students who have satisfactorily completed all other assessments for the unit and were unable to sit the final exam because of documented illness or unavoidable disruption.

You are advised that it is Macquarie University policy not to set early examinations for individuals or groups of students. All students are expected to ensure that they are available until the end of the teaching semester, which is the final day of the official examination period.

Research evaluation form information

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 40%, so a penalty of $5\% \times 40 = 2$ will be applied. 2 marks are subtracted from whatever the student received for the report for each day late.

Requests for extensions for assignments are granted by Donna Keeley.

Fit to sit model

Students who sit an exam and/or in-class test or otherwise submit an assessment, declare themselves fit to do so and will not be eligible to apply for special consideration unless there is evidence that (a) they were unfit to make reasonable judgement on their fitness to undertake the assessment, due to mental illness or other exceptional circumstances; or they were taken ill during the assessment (in the case of an examination or test), and this can be independently corroborated.

Assessment Tasks

Name	Weighting	Hurdle	Due
Final examination	60%	No	Week 13
Research Evaluation Form	40%	No	5pm Friday 3rd May

Final examination

Due: **Week 13**

Weighting: **60%**

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 prior to the exam. All allocations will be completely random and based on a random number generator.

On successful completion you will be able to:

- 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
- 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
- Understand how abstract concepts are operationalised in statistical terms in

psychological research.

- Understand the application and interpretation of several advanced statistical methods applicable to research in psychology.
- Gain an enhanced practical understanding of statistical software use in psychological research, with a focus on understanding the syntax required to carry out analyses and interpreting output.

Research Evaluation Form

Due: **5pm Friday 3rd May**

Weighting: **40%**

The Research Evaluation Form requires you to evaluate an existing empirical research article which you will be provided with. It consists of a series of short answer questions, to which you will be required to write a response. Responses may include SPSS syntax. The questions contained in the form will be made available in Week 1. All submissions are to be through Turnitin in iLearn.

Please note that you are welcome to complete the PSY418 version of this assignment, the Research Proposal Form, rather than the PSYC718 version of the assignment. Please discuss this with Naomi Sweller.

On successful completion you will be able to:

- Understand how abstract concepts are operationalised in statistical terms in psychological research.
- Understand the application and interpretation of several advanced statistical methods applicable to research in psychology.
- Gain an enhanced practical understanding of statistical software use in psychological research, with a focus on understanding the syntax required to carry out analyses and interpreting output.

Delivery and Resources

Required and recommended texts / materials

One required text:

- Field (2017). *Discovering Statistics Using IBM Statistics*. 5th edition. Sage.

Please note that the previous edition of the textbook (4th edition) will be perfectly acceptable for use in this unit. Page numbers may differ from those noted for the most recent version, but the content covered will be equivalent.

Two handbooks authored by Dr. Alan Taylor, both of which can be downloaded from iLearn:

- Introduction to IBM SPSS Statistics (“Intro”)

- Using the GLM Procedure in SPSS (“GLM”)

Two additional readings by Dr. Alan Taylor, also downloaded from iLearn:

- Taylor, A. Notes on Using the SPSS *manova* Procedure for Power Calculations
- Taylor, A. A Brief Introduction to Factor Analysis, which supplements Field Chapter 17.

Additional readings, available from the Library or from iLearn.

- Lachin, J.M. (1981). Introduction to sample size determination and power analysis for clinical trials. *Controlled Clinical Trials*, 2, 93-113.
- Chapters 10 and 14 from the textbook: Keith, T. (2006). Multiple regression and beyond. Allyn & Bacon: Boston.
- David Kenny's web page, <http://davidakenny.net/cm/mediate.htm>

Classes

Thirteen weeks: 12 x 2-hour lecture and 1-hour demonstration, with final examination held in the Week 13 lecture slot.

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 exception to this is Week 13, which will be the final exam.

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.

Unit Schedule

Week by week list of topics			
Week	Lecture Date	Lecture Topic	Reading

1	26 th February	Introduction to unit, reading data into SPSS and data manipulation	Intro 1-17, Field Chap 3
2	5 th March	Introduction to sample size and statistical power analysis	Field section 2.6.1.8 Lachin journal article + Notes on Using the SPSS manova Procedure for Power Calculations
3	12 th March	Interactions in GLM (including categorical and continuous predictors)	Field Chap 13 "GLM"
4	19 th March	Advanced Logistic Regression I	Field Chap 20
5	26 th March	Advanced Logistic Regression II	Field Chap 20
6	2 nd April	MANOVA #1	Field Chap 16
7	9 th April	MANOVA #2	Field Chap 16
Monday 15 th April – Friday 26 th April = mid-session break			
8	30 th April	Path Analyses with GLM / Regression	Keith Chap 10
9	7 th May	Path Analyses with AMOS	Field Chap 10
10	14 th May	Exploratory Factor Analysis #1	A Brief Introduction to Factor Analysis Field Chap 17
11	21 st May	Exploratory Factor Analysis #2	Field Chap 17
12	28 th May	Confirmatory factor analysis	Keith Chap 14
13	4 th June	Final examination	

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central\)](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)

- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Grade Appeal Policy](#)
- [Complaint Management Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#) (**Note:** *The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.*)

Undergraduate students seeking more policy resources can visit the [Student Policy Gateway](https://students.mq.edu.au/support/study/student-policy-gateway) (<https://students.mq.edu.au/support/study/student-policy-gateway>). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit [Policy Central](http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/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/study/getting-started/student-conduct>

Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) 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 or if you are a Global MBA student contact globalmba.support@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

If you are a Global MBA student contact globalmba.support@mq.edu.au

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the [Acceptable Use of IT Resources 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

- 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
- 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
- Understand how abstract concepts are operationalised in statistical terms in psychological research.
- Understand the application and interpretation of several advanced statistical methods applicable to research in psychology.
- Gain an enhanced practical understanding of statistical software use in psychological research, with a focus on understanding the syntax required to carry out analyses and interpreting output.

Assessment tasks

- Final examination
- Research Evaluation Form

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

- 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
- 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
- Understand how abstract concepts are operationalised in statistical terms in psychological research.
- Understand the application and interpretation of several advanced statistical methods applicable to research in psychology.
- Gain an enhanced practical understanding of statistical software use in psychological research, with a focus on understanding the syntax required to carry out analyses and interpreting output.

Assessment tasks

- Final examination
- Research Evaluation Form

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

- 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

- 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
- Understand how abstract concepts are operationalised in statistical terms in psychological research.
- Understand the application and interpretation of several advanced statistical methods applicable to research in psychology.
- Gain an enhanced practical understanding of statistical software use in psychological research, with a focus on understanding the syntax required to carry out analyses and interpreting output.

Assessment tasks

- Final examination
- Research Evaluation Form

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

- 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
- 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
- Understand how abstract concepts are operationalised in statistical terms in psychological research.
- Understand the application and interpretation of several advanced statistical methods applicable to research in psychology.
- Gain an enhanced practical understanding of statistical software use in psychological research, with a focus on understanding the syntax required to carry out analyses and

interpreting output.

Assessment tasks

- Final examination
- Research Evaluation Form

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

- 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
- 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
- Understand how abstract concepts are operationalised in statistical terms in psychological research.
- Understand the application and interpretation of several advanced statistical methods applicable to research in psychology.
- Gain an enhanced practical understanding of statistical software use in psychological research, with a focus on understanding the syntax required to carry out analyses and interpreting output.

Assessment tasks

- Final examination
- Research Evaluation Form