



PSYH4418

Design and Statistics IV

Session 1, In person-scheduled-weekday, North Ryde 2022

School of Psychological Sciences

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General Information

Unit convenor and teaching staff

Unit Chair, lecturer and tutor

Naomi Sweller

naomi.sweller@mq.edu.au

Contact via Email

2.348, Australian Hearing Hub, North Wing

By appointment

Credit points

10

Prerequisites

Corequisites

PSYH490 or PSYH4490 or PSYH495 or PSYH4495 or PSYH4491 or PSYH4492

Co-badged status

PSYM7718

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 Stata. Topics include sample size and statistical power analysis, data management in Stata 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:

ULO1: Make connections between principles of good research design and relevant research questions, and correctly apply designs to the appropriate question.

ULO2: Demonstrate an understanding of how abstract concepts are operationalised in statistical terms in psychological research.

ULO3: Apply and interpret advanced statistical methods to research in psychology.

ULO4: Demonstrate an enhanced practical understanding of statistical software used in

psychological research, with a focus on understanding the syntax required to carry out analyses and interpreting output.

General Assessment Information

Quiz

The Quiz is designed to give you early feedback on your understanding of key concepts from the initial parts of the unit. The Quiz will be conducted through iLearn and will be a mixture of multiple choice and short answer questions. The Quiz will be made available at 9am on Monday 4th April, and will close at 5pm on Friday 8th April. The Quiz is not timed, but all responses will be automatically submitted at 5pm Friday 8th April. No late submissions will be permitted unless special consideration has been granted. Results will be released at 5pm on Monday 11th April and no further submissions will be accepted after the results are returned and feedback is released.

Research proposal form information

The Research Proposal Form is designed to help you with the process of planning your empirical project. It consists of a series of short answer questions, to which you will be required to write a response. Responses may include Stata syntax. The questions contained in the form will be made available in Week 1. All submissions are to be through Turnitin in iLearn.

Penalties will be levied for late submission of the assignment: Late submission of the research proposal will receive a 5% per day penalty including weekends and public holidays, unless an extension has been granted through special consideration. In other words, the assignment is worth 35%, so a penalty of $5\% \times 35 = 1.75$ will be applied. 1.75 marks are subtracted from whatever the student received for the report for each day late. No late submissions will be accepted more than 5 days after the submission deadline, unless special consideration has been granted. No further submissions will be accepted after the marked assignments are returned and feedback is released to students, unless previously individually agreed with Naomi Sweller.

Requests for extensions for assignments involving special consideration are granted by the Honours Administrator, Donna Keeley. Please contact Naomi Sweller via email if your Honours project involves analysis using a topic covered after the mid-session break. An alternate due date will be discussed.

Final examination information

The final exam for this unit is currently scheduled to occur on Macquarie University campus. Students are expected to make themselves available for the final exam, in line with the Assessment Policy and Procedure.

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 approximately 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.

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. If a student has special circumstances such as the need for a longer testing time, they will sit the individual exam at the same time as the rest of the group, but they may start the exam earlier to enable them to finish the individual component with enough time to commence the group component with the rest of their group.

Students who are unable to sit an examination must advise the Honours administrator (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). 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.

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.

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 (b) 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
<u>Quiz</u>	10%	No	5pm Friday 8th April (Week 7)
<u>Plan (Research): Research Proposal Form</u>	35%	No	Midnight Tuesday 26th April (Week 8)

Name	Weighting	Hurdle	Due
<u>Final Examination</u>	55%	No	In class Tuesday 31st May (Week 13)

Quiz

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 10 hours

Due: **5pm Friday 8th April (Week 7)**

Weighting: **10%**

The quiz will be held online and will assess material covered in the early stages of the unit.

On successful completion you will be able to:

- Make connections between principles of good research design and relevant research questions, and correctly apply designs to the appropriate question.
- Demonstrate an understanding of how abstract concepts are operationalised in statistical terms in psychological research.
- Apply and interpret advanced statistical methods to research in psychology.
- Demonstrate an enhanced practical understanding of statistical software used in psychological research, with a focus on understanding the syntax required to carry out analyses and interpreting output.

Plan (Research): Research Proposal Form

Assessment Type ¹: Plan

Indicative Time on Task ²: 44 hours

Due: **Midnight Tuesday 26th April (Week 8)**

Weighting: **35%**

The Research Proposal Form is designed to help you with the process of planning your empirical project. No word limit required.

On successful completion you will be able to:

- Make connections between principles of good research design and relevant research questions, and correctly apply designs to the appropriate question.

- Demonstrate an understanding of how abstract concepts are operationalised in statistical terms in psychological research.
- Apply and interpret advanced statistical methods to research in psychology.
- Demonstrate an enhanced practical understanding of statistical software used in psychological research, with a focus on understanding the syntax required to carry out analyses and interpreting output.

Final Examination

Assessment Type ¹: Examination

Indicative Time on Task ²: 50 hours

Due: **In class Tuesday 31st May (Week 13)**

Weighting: **55%**

Final examination held in scheduled class time, in accordance with relevant requirements.

On successful completion you will be able to:

- Make connections between principles of good research design and relevant research questions, and correctly apply designs to the appropriate question.
- Demonstrate an understanding of how abstract concepts are operationalised in statistical terms in psychological research.
- Apply and interpret advanced statistical methods to research in psychology.
- Demonstrate an enhanced practical understanding of statistical software used in psychological research, with a focus on understanding the syntax required to carry out analyses and interpreting output.

¹ If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the [Writing Centre](#) for academic skills support.

² Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

Textbooks

There are two textbooks for this unit, both available through the Library:

Tabachnick, B., & Fidell, L. (2019). *Using Multivariate Statistics* (7th ed.). New York, NY: Pearson.

Keith, T. Z. (2019). *Multiple regression and beyond: an introduction to multiple regression and structural equation modeling* (3rd ed.). New York, NY: Routledge.

Please note that the previous editions of the textbooks will be acceptable for use in this unit. Page numbers may differ from those noted for the most recent editions, and you should check carefully with the library holdings of the prescribed editions that the content is equivalent.

Additional reading

There is an additional reading for the week on power and sample size:

Lachin, J. M. (1981). Introduction to sample size determination and power analysis for clinical trials. *Controlled Clinical Trials*, 2, 93-113.

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

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.

This version of the unit is “In person scheduled weekday”. Students should not attend on-campus classes if you are unwell or have any cold and flu-like symptoms. Ensure you follow the most recent University COVID-19 advice <https://www.mq.edu.au/about/coronavirus-faqs/information-for-students>

Unit Schedule

Week	Lecture topic	Required reading
1	Introduction to unit, Research Ethics, Data manipulation in Stata	TBA
2	Introduction to sample size and statistical power analysis	Tabachnick & Fidell, sections 1.5, 3.1.2. Lachin journal article
3	Interactions in regression (including categorical and continuous predictors)	Tabachnick & Fidell, section 5.6.6 Keith, Chapters 7 & 8

4	Advanced Logistic Regression #1	Keith, Chapter 11 (logistic regression section only) Tabachnick & Fidell, Chapter 10
5	Advanced Logistic Regression #2	Tabachnick & Fidell, Chapter 10
6	MANOVA	Tabachnick & Fidell, Chapter 7
7	Multi-Level Modelling	Tabachnick & Fidell, Chapter 15
8	Path Analyses with Regression	Keith, Chapters 12 & 13 Tabachnick & Fidell, section 5.6.7
9	Path Analyses through SEM	Keith, Chapter 14 Tabachnick & Fidell, Chapter 14 (this chapter is optional and includes much more detail than needed)
10	Exploratory Factor Analysis #1	Tabachnick & Fidell, Chapter 13
11	Exploratory Factor Analysis #2	Tabachnick & Fidell, Chapter 13
12	Confirmatory Factor Analysis	Keith, Chapter 16
13	Final examination	

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au). 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](#)
- [Assessment Procedure](#)
- [Complaints Resolution Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#)

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

To find other policies relating to Teaching and Learning, visit [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au) and use the [search tool](#).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/admin/other-resources/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

Academic Integrity

At Macquarie, we believe [academic integrity](#) – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free [online writing and maths support](#), [academic skills development](#) and [wellbeing consultations](#).

Grading

Macquarie University follow standards-based assessment of student performance. All individual assessment tasks are subject to moderation, consistent with the Assessment Policy and Procedure. A student's final mark for this unit, and associated grade, must reflect their attainment of the unit learning outcomes, and isn't necessarily a simple summation of their individual assessment items.

Student Support

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

The Writing Centre

[The Writing Centre](#) provides resources to develop your English language proficiency, academic writing, and communication skills.

- [Workshops](#)
- [Chat with a WriteWISE peer writing leader](#)
- [Access StudyWISE](#)
- [Upload an assignment to Studiosity](#)
- [Complete the Academic Integrity Module](#)

The Library provides online and face to face support to help you find and use relevant information resources.

- [Subject and Research Guides](#)
- [Ask a Librarian](#)

Student Services and Support

Macquarie University offers a range of [Student Support Services](#) including:

- [IT Support](#)
- [Accessibility and disability support](#) with study
- Mental health [support](#)
- [Safety support](#) to respond to bullying, harassment, sexual harassment and sexual assault
- [Social support](#) including information about finances, tenancy and legal issues

Student Enquiries

Got a question? Ask us via [AskMQ](#), or contact [Service Connect](#).

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.