PSYM7718

Advanced Research Design and Statistics

Session 1, Special circumstances 2021

Archive (Pre-2022) - Department of Psychology

Contents

Notice

As part of Phase 3 of our return to campus plan, most units will now run tutorials, seminars and other small group activities on campus, and most will keep an online version available to those students unable to return or those who choose to continue their studies online.

To check the availability of face-to-face activities for your unit, please go to timetable viewer. To check detailed information on unit assessments visit your unit's iLearn space or consult your unit convenor.

General Information

Unit convenor and teaching staff Naomi Sweller naomi.sweller@mq.edu.au
Credit points 10
Prerequisites Admission to MRes
Corequisites
Co-badged status
Unit description This unit is designed as preparation for the Master of Research projects and to help equip you for your research career. 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: 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

ULO2: Know how abstract concepts are operationalised in statistical terms in psychological research.

ULO3: Understand the application and interpretation of several advanced statistical methods applicable to research in psychology.

ULO4: Gain 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

Final examination information

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 (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 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). 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 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

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 Stata 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 PSYH4418 version of this assignment, the Research Proposal Form, rather than the PSYM7718 version of the assignment. Please discuss this with Naomi Sweller.

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% x 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	23/04/2021

Final examination

Assessment Type [1]: Examination
Indicative Time on Task [2]: 54 hours
Due: **Week 13**
Weighting: **60%**

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

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

Research Evaluation form

Assessment Type [1]: Plan
Indicative Time on Task [2]: 50 hours
Due: **23/04/2021**
Weighting: **40%**

The Research Evaluation 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:
- Know 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 used in psychological research, with a focus on understanding the syntax required to carry out analyses and interpreting output.

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[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. The lectures will be run online, via Zoom.

Lectures will involve demonstrations of Stata procedures, using various examples. 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. 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	Lecture topic	Required reading
1	Introduction to unit, Research Ethics, Data manipulation in Stata	TBA (not required to be read before class)
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 #1	Tabachnick & Fidell, Chapter 7
7	MANOVA #2	Tabachnick & Fidell, Chapter 7
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). 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

Students seeking more policy resources can visit Student 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) 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

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 help you improve your marks and take control of your study.

- Getting help with your assignment
- Workshops
- StudyWise
- 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

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.