COGS3030

Human Neuroimaging

Session 2, In person-scheduled-weekday, North Ryde 2023

School of Psychological Sciences

Contents

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General Information

Unit convenor and teaching staff
Convenor and Lecturer
Mark Williams
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Bianca De Wit
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Credit points
10

Prerequisites
130cp including (COGS2000 or COGS202) and (COGS2020 or BIOL2610 or STAT2170 or
STAT2371 or PSYU2248)

Corequisites

Co-badged status

Unit description
The human brain is among the most complex and powerful information processing systems
known. Since the emergence of cognitive neuroscience as a field several decades ago, an
impressive range of methods have been developed to investigate the structure and function of
the human brain. In this unit, students will learn key principles of a range of functional
neuroimaging techniques including functional magnetic resonance imaging (fMRI),
electroencephalography (EEG), magnetoencephalography (MEG), and functional near
infrared spectroscopy (fNIRS). The unit focuses on conceptual and methodological issues
surrounding these techniques, giving students the opportunity to think critically about the
advantages and disadvantages of each technique for addressing research questions in the
field of cognitive neuroscience. The unit will also cover clinical applications of neuroimaging
such as its use for investigating autism and schizophrenia.

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: Demonstrate advanced knowledge of neuroimaging methods and their

application to the investigation of human brain function.

ULO2: Explain the strengths and limitations of various neuroimaging methods and be able to identify the optimal method for a particular research question.

ULO3: Discuss key concepts and theories in relation to research findings obtained through different neuroimaging methods.

ULO4: Interpret and critically evaluate the results of neuroimaging studies.

General Assessment Information

Presentation

Assessment Type [1]: Presentation Indicative Time on Task [2]: 5 hours Due: **Week 4 & 6** Weighting: **10%**

Contribution to a group presentation contrasting two neuroimaging approaches to the same research question (5%) and individual written summary (5%; max. 300 words)

On successful completion you will be able to:

- Discuss key concepts and theories in relation to research findings obtained through different neuroimaging methods.
- Interpret and critically evaluate the results of neuroimaging studies.

Data analysis write-up 1

Assessment Type [1]: Quantitative analysis task Indicative Time on Task [2]: 15 hours Due: **Week 10** Weighting: **20%**

Analysis of curated dataset and write-up of methods and results (max. 1000 words)

On successful completion you will be able to:

- Demonstrate advanced knowledge of neuroimaging methods and their application to the investigation of human brain function.
- Explain the strengths and limitations of various neuroimaging methods and be able to identify the optimal method for a particular research question.

Data analysis write-up 2

Assessment Type [1]: Quantitative analysis task Indicative Time on Task [2]: 25 hours Due: **Week 13** Weighting: **30%**

Analysis of curated dataset and write-up of methods and results (max. 1500 words)

On successful completion you will be able to:

- Demonstrate advanced knowledge of neuroimaging methods and their application to the investigation of human brain function.

- Explain the strengths and limitations of various neuroimaging methods and be able to identify the optimal method for a particular research question.

Final exam

Assessment Type [1]: Examination Indicative Time on Task [2]: 40 hours Due: **Semester 2 Exam Period** Weighting: **40%**

Multiple-choice and short answer questions

On successful completion you will be able to:

- Demonstrate advanced knowledge of neuroimaging methods and their application to the investigation of human brain function.
- Explain the strengths and limitations of various neuroimaging methods and be able to identify the optimal method for a particular research question.
- Discuss key concepts and theories in relation to research findings obtained through different neuroimaging methods.
- Interpret and critically evaluate the results of neuroimaging studies.

[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

Assessment Tasks

Name	Weighting	Hurdle	Due
Presentation	10%	No	Week 4 & 6
Data analysis write-up 1	20%	No	Week 10
Data analysis write-up 2	30%	No	Week 13
Final exam	40%	No	Semester 2 Exam Period

Presentation

Assessment Type [1]: Presentation
Indicative Time on Task [2]: 5 hours
Due: **Week 4 & 6**
Weighting: **10%**

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Delivery and Resources

As a student enrolled in this unit, you will engage in a range of online and face-to-face learning activities, including readings, practical laboratory activities and lectures. Details can be found on the iLearn site for this unit.

Textbook

Introduction to Human Neuroimaging (2019)

by Hans Op de Beeck and Chie Nakatani

This book may be purchased online from Booktopia.

Technology Used

Active participation in the learning activities throughout the unit will require students to have access to a tablet, laptop or similar device.

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
- 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). 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

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.

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 Advocacy provides independent advice on MQ policies, procedures, and processes

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.

Inclusion and Diversity

Social inclusion at Macquarie University is about giving everyone who has the potential to benefit from higher education the opportunity to study at university, participate in campus life and flourish in their chosen field. The University has made significant moves to promote an equitable, diverse and exciting campus community for the benefit of staff and students. It is your responsibility to contribute to the development of an inclusive culture and practice in the areas of learning and teaching, research, and service orientation and delivery. As a member of the Macquarie University community, you must not discriminate against or harass others based on their sex, gender, race, marital status, carers' responsibilities, disability, sexual orientation, age, political conviction or religious belief. All staff and students are expected to display appropriate

behaviour that is conducive to a healthy learning environment for everyone.

Professionalism

In the Faculty of Medicine, Health and Human Sciences, professionalism is a key capability embedded in all our courses.

As part of developing professionalism, students are expected to attend all small group interactive sessions including clinical, practical, laboratory, work-integrated learning (e.g., PACE placements), and team-based learning activities. Some learning activities are recorded (e.g., face-to-face lectures), however you are encouraged to avoid relying upon such material as they do not recreate the whole learning experience and technical issues can and do occur. As an adult learner, we respect your decision to choose how you engage with your learning, but we would remind you that the learning opportunities we create for you have been done so to enable your success, and that by not engaging you may impact your ability to successfully complete this unit. We equally expect that you show respect for the academic staff who have worked hard to develop meaningful activities and prioritise your learning by communicating with them in advance if you are unable to attend a small group interactive session.

Another dimension of professionalism is having respect for your peers. It is the right of every student to learn in an environment that is free of disruption and distraction. Please arrive to all learning activities on time, and if you are unavoidably detained, please join activity as quietly as possible to minimise disruption. Phones and other electronic devices that produce noise and other distractions must be turned off prior to entering class. Where your own device (e.g., laptop) is being used for class-related activities, you are asked to close down all other applications to avoid distraction to you and others. Please treat your fellow students with the utmost respect. If you are uncomfortable participating in any specific activity, please let the relevant academic know.

Changes since First Published

Date	Description
23/07/2023	Staff contacts changed.

Unit information based on version 2023.01R of the Handbook