



SPH 312

Speech Perception and Hearing Science

S1 Day 2018

Dept of Linguistics

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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 (Speech Perception), Tutor, Coordinator

Titia Benders

titia.benders@mq.edu.au

Australian Hearing Hub; Office 3.501

Fridays 1pm-2pm (pre-register via e-mail)

Lecturer (Hearing)

Baljeet Rana

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Contact via 02 9412 6760

Australian Hearing Hub, level 5 (NAL)

By appointment

Lecturer (Hearing), Tutor

Amanda Fullerton

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Contact via 02 9850 8106

Australian Hearing Hub, MQ Speech and Hearing Clinic, room G330

By appointment

Administration

Margaret Wood

margaret.wood@mq.edu.au

Contact via 02 9850 8740

C5A-12 SECOND WAY 502

By appointment

Credit points

3

Prerequisites

39cp at 100 level or above including (6cp in LING units at 200 level including (LING210 or LING217))

Corequisites

Co-badged status

Unit description

This unit is a detailed examination of human auditory anatomy and physiology, and also of psychoacoustics and speech perception. The structure of the outer, middle and inner ear, the auditory nerve, the auditory brainstem and the auditory cortex are examined, as are the mechanisms of hearing and the physiology of the auditory system. Another major focus of this unit is the psychoacoustics of hearing and speech perception, which are examined both in lectures and in practicals.

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:

- Demonstrate an advanced knowledge of the anatomy and physiology of the ear to the cortex
- Demonstrate and communicate an understanding of neural anatomy and physiology as this relates to sound encoding
- Analyse the processes involved in successful hearing, and evaluate what factors may lead to compromised audition
- Analyse, interpret and report on clinical auditory data to engage with theoretical issues relating to clinical assessment techniques
- Demonstrate understanding of psychoacoustic phenomena
- Apply an advanced understanding of speech perception as a mapping of auditory information on linguistic representations
- Evaluate, make informed decisions regarding, and report on the methods, data, and results from speech perception experiments
- Communicate on methods, results, and theories of speech perception within typical and special populations.

General Assessment Information

The assessment tasks have been designed to enable students to demonstrate critical thinking skills and problem-solving skills in the understanding of how the auditory system works, psychoacoustics and speech perception.

Completion of All Assessment Tasks:

All assessment tasks are compulsory. It is a requirement of this unit that students make a serious attempt to complete all assessment tasks. Failure to make a serious attempt to complete all

assessment tasks may result in failure in the whole unit even if the total marks for completed tasks add up to more than 50%. In such cases, failure results from the learning outcomes of the unit not being met.

Assignment Submission:

All assignments must be submitted via turnitin. For each assignment, you **MUST** submit the assignment in pdf format. Add a footer to each page of the assignment, with page numbering, your name and student number, “SPH312 2018”, and the assignment number clearly marked. Assignments without a footer may be returned late, may be marked incorrectly, or may not be accepted at all. Students must keep a copy of each assignment as proof that it was completed and submitted in the event that a submitted assignment is misplaced or damaged.

Return of Marked Assignments:

Students’ marked assignments will, in general, be returned to them within 3 weeks of submission. Students will receive letter grades (and not marks) for their assignments. Any marks that students may receive, see, or infer from a Turnitin rubric are only approximations, and cannot for the basis for an appeal.

How to apply for a late submission of an assignment

All requests for special consideration, including extensions, must be submitted via [ASK.mq.edu.au](https://ask.mq.edu.au) and provide suitable supporting documentation.

Please make us aware of any circumstance that may affect your ability to complete an assessment on time. We are often able to help you manage your study load if we are aware of the situation *before the assignment deadline*. Requests for special consideration must always be submitted via [ASK.mq.edu.au](https://ask.mq.edu.au), within 5 days after the assignment deadline.

Late Assignment Submission

- Late submissions without an extension will receive a penalty of 5% of the total mark available for the assignment per day
- Late submission of an assignment without an extension will not be permitted after marks have been released to the rest of the class.
- Extensions will only be given in special circumstances, and can be requested by completing the Special Consideration request at ask.mq.edu.au and providing the requisite supporting documentation.
- For more information on Special Consideration, see the university website <https://students.mq.edu.au/study/my-study-program/special-consideration>
- Assignments submitted after the deadline, regardless of the reason, will be marked and returned at a date determined by the unit convenor.
- Extensions cannot continue beyond the start of the following semester, and students should be aware that long extensions may impact graduation dates.

Appeals Against Grades

If a student has a problem with the mark given for a particular assessment, the student should contact the Unit Convenor directly. A request for a re-mark must be lodged within two weeks of the date of receipt of the assessment. If a remark is granted, the final mark can be sustained, raised or lowered.

If a student wishes to appeal against a final grade for a unit, then the student should lodge their appeal via ask@mq.edu.au.

http://students.mq.edu.au/support/complaints_appeals/appeals/

Assessment Tasks

Name	Weighting	Hurdle	Due
Categorical Perception Report	20%	No	28/03/2018; Wed 5pm
Experiment Proposal	25%	No	25/04/2018; Wed 5pm
DPOAE Practicum and Report	20%	No	30/05/2018; Wed 5pm
Exam	35%	No	Within Exam Period

Categorical Perception Report

Due: **28/03/2018; Wed 5pm**

Weighting: **20%**

Categorical Perception is a benchmark phenomenon in the study of speech perception. This practicum will introduce you to the experimental procedures involved in measuring Categorical Perception. You will be asked to interpret the data collected in the practicum and write a concise lab report outlining the findings. Submission of this assignment is compulsory.

On successful completion you will be able to:

- Apply an advanced understanding of speech perception as a mapping of auditory information on linguistic representations
- Evaluate, make informed decisions regarding, and report on the methods, data, and results from speech perception experiments
- Communicate on methods, results, and theories of speech perception within typical and special populations.

Experiment Proposal

Due: **25/04/2018; Wed 5pm**

Weighting: **25%**

Speech perception research, as all science, is an incremental process. This assessments invites you to formulate a follow-up experiment on a speech perception study published in an

international scientific journal, in 2016 or 2017. You will be asked to write a concise experiment proposal, in which you 1) critically evaluate the original paper; 2) formulate a question and hypothesis; 3) outline appropriate methods and predicted results; 4) discuss implications of predicted outcomes. Submission of this assignment is compulsory.

On successful completion you will be able to:

- Apply an advanced understanding of speech perception as a mapping of auditory information on linguistic representations
- Evaluate, make informed decisions regarding, and report on the methods, data, and results from speech perception experiments
- Communicate on methods, results, and theories of speech perception within typical and special populations.

DPOAE Practicum and Report

Due: **30/05/2018; Wed 5pm**

Weighting: **20%**

In this practicum, you will develop an understanding of the clinical use of distortion product otoacoustic emissions (DPOAEs), the clinical equipment used to measure them and the procedure undertaken for this. You will also develop an appreciation for physiological and non-physiological factors that could result in an absent evoked emission. Submission of this assignment is compulsory.

On successful completion you will be able to:

- Analyse, interpret and report on clinical auditory data to engage with theoretical issues relating to clinical assessment techniques

Exam

Due: **Within Exam Period**

Weighting: **35%**

The aim of the final exam is to assess the learning outcomes related to hearing science and psychoacoustics. This exam will be 3 hours in duration.

The following website provides details of the university examination policy:

<http://www.mq.edu.au/policy/docs/examination/policy.html> Only in exceptional circumstances will supplementary exams be available. Request for supplementary exams are submitted as special consideration to ask@mq.

On successful completion you will be able to:

- Demonstrate an advanced knowledge of the anatomy and physiology of the ear to the cortex

- Demonstrate and communicate an understanding of neural anatomy and physiology as this relates to sound encoding
- Analyse the processes involved in successful hearing, and evaluate what factors may lead to compromised audition
- Demonstrate understanding of psychoacoustic phenomena

Delivery and Resources

Week 1

Holt, L. L., & Lotto, A. J. (2010). Speech perception as categorization. *Attention, Perception & Psychophysics*, 72(5), 1218–1227. <https://doi.org/10.3758/APP.72.5.1218>

Note: Parts of the Holt & Lotto paper will be re-read during the other weeks.

Suggested: Raphael, L. J. (2008). Acoustic Cues to the Perception of Segmental Phonemes. *The Handbook of Speech Perception*, 182–206. <https://doi.org/10.1002/9780470757024.ch8>

Week 2:

Dupoux, E., Pallier, C., Sebastian, N., & Mehler, J. (1997). A Destressing “Deafness” in French? *Journal of Memory and Language*. <https://doi.org/10.1006/jmla.1996.2500>

Suggested: Cutler, A., Oahan, D., & Donselaar, W. Van. (1997). Prosody in the Comprehension of Spoken Language: A Literature Review*. *LANGUAGE AND SPEECH*, 40(2), 141–201.

Week 3:

Ingvalson, E. M., Ettlinger, M., & Wong, P. C. M. (2014). Bilingual speech perception and learning: A review of recent trends. *International Journal of Bilingualism*, 18(1), 35–47. <https://doi.org/10.1177/1367006912456586>

Week 4:

Nittrouer, S., Caldwell-Tarr, A., Moberly, A. C., & Lowenstein, J. H. (2014). Perceptual weighting strategies of children with cochlear implants and normal hearing. *Journal of Communication Disorders*, 52, 111–133. <https://doi.org/10.1016/j.jcomdis.2014.09.003>

Week 5:

Junge, C., Boll-Avetsijan, N., & Benders, T. (submitted) Speech perception and discrimination: from sounds to words. Submitted chapter <note: no library access yet>

Suggested: Walley, A. C. (2008). Speech Perception in Childhood. In D. B. Pisoni, R. E. Remez, & A. C. Walley (Eds.), *The Handbook of Speech Perception* (pp. 449–469). Wiley Online Library. <https://doi.org/10.1093/acrefore/9780199384655.013.62>

Background in tutorial: Holt, C. M., Demuth, K., & Yuen, I. (2015). The use of prosodic cues in sentence processing by prelingually deaf users of cochlear implants. *Ear and Hearing*, 1–7. <https://doi.org/10.1097/AUD.0000000000000253>

Week 6:

Week 1 reading repeated

Categorical Perception Assignment:

Pisoni, D. B. (1973). Auditory and phonetic memory codes in the discrimination of consonants and vowels. *Perception & Psychophysics*, 13(2), 253–260. <https://doi.org/10.3758/BF03214136>

Experiment Proposal Assignment:

Self-selected article from 2016 and 2017 issues of “Ear & Hearing” or “The Journal of Phonetics”. If you want to select a paper from another journal as the basis of your experiment proposal, please discuss this with Titia Benders before the week 5 tutorial on this assignment. All articles are subject to approval by Titia Benders.

DPOAE Assignment:

Fettiplace R. Hackney CM. (2006). The sensory and motor roles of auditory hair cells. *Nature Reviews Neuroscience*, 7; 19-29. Lonsbury BL.

Martin GK. (1990). The clinical utility of distortion-product otoacoustic emissions. *Ear & Hearing*, 11; 144-154.

Kemp DT. (2002). Otoacoustics emissions, their origin in cochlear function, and use. *British Medical Bulletin*, 63 (1): 223-241.

Unit Schedule

Wk/ Thu date	Due Wed 5pm	Lecture prep	Lecture	Practicum prep	Practicum
			Thu 11-1, 9 Wally's Walk, rm 133		Thu 2-3.30/ 3.30-5 11 Wally's Walk, rm 170
1/ 1 Mar		-Holt & Lotto, 2010 (henceforth: H&L)	Perception of Segments Introduction Assignment 1 TB	-Collect Categorical Perception data at home and send to Titia	No prac
2/ 8 Mar		-Dupoux et al., 1997	Perception of Prosody TB	-Read Pisoni (1973) -Plot and process your own data	Discussion of data processing TB
3/ 15 Mar		-Ingvalson et al., 2014 -H&L, p4-par2/3	L2 Development of Speech Perception TB	-Process and begin to interpret all data in light of the research question	Discussion of results and report writing TB

4/ 22 Mar		-Nittrouer et al., 2014 -H&L p8-par3	Speech Perception by Hearing-Impaired listeners TB		No prac
5/ 29 Mar	Categorical perception report	-Junge, Boll & Benders (submitted) -H&L, p3-par3/4; p4-par1	Early first language acquisition of speech perception TB	-Choose an article from 2016/2017 (selected journals) to form the basis for your experiment proposal; submit article to iLearn prior to the practicum.	-Practice in formulating experiment proposal - Evaluation of articles by TB; TB
6/ 5 Apr		Holt & Lotto, 2010 (repeated to re-evaluate)	Discussion of speech perception research TB	-Formulate your "Expression of Interest"	Peer discussion of "Expressions of Interest" TB
7/ 12 Apr		TBC	The Ear AF	-Formulate your experiment proposal	Final discussion of experiment proposals TB
B1					
B2	Experiment proposal				
8/ 3 May		TBC	Cochlear anatomy / physiology AF		Collect DPOAE data AF
9/ 10 May		TBC	Cochlear transduction AF	- Process DPOAE data, in order to ask questions during the practicum.	Discuss DPOAE data processing AF
10/ 17 May		TBC	Neural function AF/BR		No prac
11/ 24 May		TBC	Brainstem nuclei and efferent pathways BR		No prac

12/ 31 May	DPOA report	TBC	Auditory cortex BR	No prac
13/ 7 June		TBC	Psychoacoustics TB/BR	No prac
	Exam in exam week			

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](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>).

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 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.m](#)

mq.edu.au.

Communication about the unit

We welcome all your questions during lectures, during tutorials, and during the 10 minutes before and after lectures/tutorials. Please never hesitate to come talk to us! We strictly adhere to posting all *written* student questions and answers on iLearn. Our aim in doing this is providing all students with access to the same information. You can ask questions directly on the iLearn discussion fora, for your peers, tutor, or lecturer to answer (recommended option). You may also e-mail your lecturer or tutor, with the request that they post the question (anonymously) with the answer on iLearn. Questions of a personal nature are of course excluded from this procedure. Please contact Titia Benders (the unit convenor) directly if you have any personal questions or concerns.

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://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

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

- Demonstrate an advanced knowledge of the anatomy and physiology of the ear to the cortex
- Demonstrate and communicate an understanding of neural anatomy and physiology as this relates to sound encoding
- Analyse the processes involved in successful hearing, and evaluate what factors may lead to compromised audition
- Analyse, interpret and report on clinical auditory data to engage with theoretical issues relating to clinical assessment techniques
- Demonstrate understanding of psychoacoustic phenomena
- Apply an advanced understanding of speech perception as a mapping of auditory information on linguistic representations
- Evaluate, make informed decisions regarding, and report on the methods, data, and results from speech perception experiments
- Communicate on methods, results, and theories of speech perception within typical and special populations.

Assessment tasks

- Categorical Perception Report
- Experiment Proposal
- DPOAE Practicum and Report
- 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

- Analyse the processes involved in successful hearing, and evaluate what factors may lead to compromised audition
- Analyse, interpret and report on clinical auditory data to engage with theoretical issues relating to clinical assessment techniques
- Apply an advanced understanding of speech perception as a mapping of auditory information on linguistic representations
- Evaluate, make informed decisions regarding, and report on the methods, data, and results from speech perception experiments
- Communicate on methods, results, and theories of speech perception within typical and special populations.

Assessment tasks

- Categorical Perception Report
- Experiment Proposal
- DPOAE Practicum and Report
- 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

- Analyse, interpret and report on clinical auditory data to engage with theoretical issues relating to clinical assessment techniques
- Evaluate, make informed decisions regarding, and report on the methods, data, and results from speech perception experiments
- Communicate on methods, results, and theories of speech perception within typical and special populations.

Assessment tasks

- Categorical Perception Report
- Experiment Proposal
- DPOAE Practicum and Report

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

- Analyse, interpret and report on clinical auditory data to engage with theoretical issues relating to clinical assessment techniques
- Evaluate, make informed decisions regarding, and report on the methods, data, and results from speech perception experiments
- Communicate on methods, results, and theories of speech perception within typical and special populations.

Assessment tasks

- Categorical Perception Report
- Experiment Proposal
- DPOAE Practicum and Report
- Exam

Changes from Previous Offering

Learning outcome 4 has been changed from:

4. Analyse, interpret and report on audiometric data to engage with theoretical issues relating to clinical assessment techniques

to

4. Analyse, interpret and report on clinical auditory data to engage with theoretical issues relating to clinical assessment techniques

Changes have gone through the University's Quality Assurance mechanism (FSQC) for approval.

Changes since First Published

Date	Description
13/02/2018	Changes compared to previous offering have been included.