



**UNIVERSITY OF
CAMBRIDGE**

Department of Psychology

NST Part II Course Guide

Part II Psychology

Part II Psychological and Behavioural Sciences

Part II BBS Major Subject Psychology

Course Guide

Academic Year 2020– 2021

The information contained in this Course Guide is correct at the time of going to press (30/09/2020), but all matters covered are subject to change from time to time.

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Introduction

Welcome to the Department of Psychology.

Some of you may have chosen Psychology because its subject matter, the mind, remains largely mysterious and because it is rich in disputed theories. Consequently, you can strive to be original and questioning without being thought presumptuous. We will certainly encourage you to construct your own views where possible, and enjoy your contribution.

Many of you have already received some teaching in Psychology at Part IB and so will have come to appreciate something of the breadth and variety of the discipline, and this is reflected in our Part II course. This does mean that you will find yourself having to make decisions early on and throughout the course about where you are going to focus your interests. It would be unwise to make these decisions without consulting your Director of Studies.

In accordance with normal practice, we list the aims and objectives of this course; you will find these on the next page.

We hope you enjoy your year with us!

Aims and Objectives of the Part II Course

Aims

The academic aims of the Part II course are as follows:

- to provide students with the conceptual tools and background knowledge required to understand developments in the sciences of mind and brain, including appreciation of the range of behavioural and physiological sources of evidence and multiple levels of theoretical analysis;
- to inculcate skills of scientific reasoning, research and reporting that are useful to both future specialists in psychology and related disciplines and professions, and to graduates who proceed to other occupations;
- to provide within the context of the Natural Sciences Tripos an education in experimental psychology and cognitive neuroscience of high quality, and to produce graduates of the calibre sought by the professional and the public services, as well as the academic teachers and researchers of the future.

An additional professional aim applies to the Part II Psychology option:

- to provide a course that, taken together with NST IB Experimental Psychology, will prepare our graduates for professional training in psychology.

Student Learning Outcomes

By the end of the course, students should have:

- received a training in experimental psychology and cognitive neuroscience at a level of sophistication equivalent to the nationally recognised standards for a degree in Psychology;
- further developed conceptual tools required for analysis of mind, brain and behaviour;
- extended their knowledge and understanding of selected topics to the frontiers of research;
- gained experience of psychological research and scientific reporting through the conduct and writing up of a supervised research project;
- acquired and exercised techniques of statistical analysis in common use in experimental psychology and cognitive neuroscience;
- had the opportunity to develop the skills of literature search, critical review, and extended expository writing through preparing a dissertation.

The Department

This is one of the oldest psychology departments in the country, established in 1897. In 2012 two former sub-departments of psychology merged, the Department of Experimental Psychology (on the Downing Site) and the Department of Social and Developmental Psychology (on Free School Lane), to create a unified Department of Psychology. 2013 marked the inauguration of the Psychological and Behavioural Sciences (PBS) Tripos, a new undergraduate degree that we expect to complement the NST stream. While we remain a relatively small Department as measured by the number of our University Teaching Officers, we do accommodate many post-doctoral research scientists and postgraduate research students, many of whom who serve as supervisors for lecture courses and Part II research projects.

Physically, the Department occupies three adjacent buildings on the Downing Site, and the Old Cavendish Laboratory on Free School Lane. The main Psychological Laboratory building on the Downing Site houses most of the facilities used by Part II students: our lecture theatre, our practical classroom with a Macintosh network, a well-stocked Library (and helpful Librarian), technical workshops, and the Student Common Room (containing photocopiers, snack and drinks machines, and computer access), in addition to Reception. The remaining floors contain offices and laboratories.

Immediately to the west is the Craik-Marshall building, holding the Kenneth Craik seminar room on the ground floor, and further laboratories and offices throughout the building. Immediately to the south is the William Hardy Building, of which we occupy much of the ground, second and third floors. The Department houses the University of Cambridge Behavioural and Clinical Neuroscience Institute (BCNI), funded by a consortium grant from the Medical Research Council (MRC) and Wellcome Trust. There are members of the Department also working elsewhere in Cambridge e.g. Douglas House and Addenbrooke's Hospital.

We are fortunate in having the MRC Cognition and Brain Sciences Unit (MRC-CBU) nearby in Chaucer Road, which is a major research centre for cognitive psychology and cognitive neuroscience. Some of its members provide supervisions for our Part II courses and Part II research projects. The Department also has links with the Department of Psychiatry at Addenbrooke's Hospital on Hills Road and its Autism Research Centre on Trumpington Road, and the Brain Mapping Unit in the William Hardy Building.

Department Contact Details:

Department of Psychology
University of Cambridge
Downing Site
Cambridge CB2 3EB
Tel: 01223 333550

[Psychology Department Website](#)

Contacts for questions, feedback, and further information:

- Questions about paper choices, supervision arrangements:
 - Talk to DoS
- Questions about lecture content/reading etc:
 - Check lecture notes, slides, reading materials, and other online resources
 - Ask supervisor
- Questions about a specific paper
 - Check paper guide and other online resources
 - Ask paper co-ordinator

- Administrative questions (e.g., deadlines)
 - Check paper guide and other online resources
 - Teaching administrator

- When no-one else can help...
 - Part II Course Organiser
 - Deputy Head of Department

Role	Contact Details
Part II Course Organiser	Dr Mirjana Bozic, mb383@cam.ac.uk
Teaching Administrator	Mr Richard Sellens teaching@psychol.cam.ac.uk
Teaching Secretary	Mrs Louise White teaching@psychol.cam.ac.uk
Librarian	Ms Daniele Campello Dos Santos library@psychol.ac.uk
Deputy Head of Department (Teaching)	Dr Kate Plaisted-Grant kcp1000@cam.ac.uk
Head of Department	Prof Mark Johnson mj492@cam.ac.uk

Our Part II Course: What is it and who does it?

Scientific psychology largely concerns itself with what can be objectively observed, measured and counted. It subsumes the study of abnormal behaviour insofar as it can inform us about normal behaviour, and in the hope of contributing to the development of treatments. The substantial proportion of our teaching and research focuses on normal functioning and the mechanisms underlying mental processes and the control of behaviour in animals and in human beings of all ages.

Our Part II courses allow students to study a diverse selection of the sub-fields of psychology (e.g. sensory processes, motor skill, cognition, learning and memory, language, emotions and motivation, attention and control). These topics are often investigated at several levels: in terms of their neural substrate, their functional and computational architecture, the intra-personal level of states of conscious awareness, and the inter-personal level of minds in interaction with others. It is also possible to compare behavioural capacities and nervous systems across species in order to view human psychology in evolutionary terms. Alternatively, one may focus on the development of perceptual, cognitive and social skills throughout the life span or on the causes and consequences of their malfunction in mental illness and brain damage. Psychology has a considerable overlap with disciplines such as neuroscience, psychiatry, ethology, behavioural ecology, behavioural genetics, anthropology, computer science, linguistics, philosophy and sociology.

Psychology degree courses within universities differ in terms of the aspects of the discipline that they emphasise. The Cambridge Psychology Department, located as it is within a Biological Sciences Faculty, has maintained an abiding concern with neurobiological processes.

About 60 students take the Part II course each year. Of these, some are natural scientists who have completed the NST IB Experimental Psychology course. These students have a mixture of physical science and biological science backgrounds. We also take a significant number of medical students who will have taken the core course in MVST IB Neurobiology and Human Behaviour. In addition, we share our courses with students taking Psychological and Behavioural Sciences Tripos (PBST) Part II, and borrow some courses from the PBST Part II. Finally, some lecture courses are available for students taking NST Part II Psychology, Neuroscience and Behaviour.

We endeavour to make allowances for discrepancies in academic background among our students. To this end, lectures sometimes revisit material first presented in the NST IB course. Medics are invited to attend some of our NST IB lectures, because this is an efficient way to fill gaps in knowledge. We have made allowances for this in the Part II timetable.

The NST Part II Psychology Course

Structure of the Course

The course includes four papers and three additional pieces of work, but not all students will take all of them. We describe the overall structure of the course first, and then the work expected from students who take this course as part of three different degrees.

The course is divided into four papers:

- Paper 1: Methods of inquiry in psychology
- Paper 2: Cognitive and Experimental Psychology
- Paper 3: Behavioural and Cognitive Neuroscience
- Paper 4: Social Psychology, Developmental Psychology and Individual Differences

All lectures take place in the Michaelmas and Lent terms only. All lectures in 2020-2021 will be delivered online.

The papers in Cognitive and Experimental Psychology and Behavioural and Cognitive Neuroscience comprise a number of 8-lecture courses, which run concurrently. Their details are available at the end of this course guide. Lecture courses are timetabled so as to ensure that it is possible to go to every one of them. You can therefore sample initial lectures from each course to see whether you like it.

Your fourth Paper will be one of three Papers delivered in the Part II Psychology and Behavioural Sciences Tripos (see PBS Marking and Classing Criteria in Exam Information section on Moodle for more specific details). You will choose one Paper from those offered in Part II of the PBS Tripos: PBS 6 Developmental Psychopathology OR PBS 7 Advanced Topics in Social Psychology OR PBS 8 The Family.

We suggest that you discuss your choices with your Director of Studies.

In addition to these papers, students will complete at least one additional piece of work, depending on their Tripos. Candidates taking Psychology as their major subject in NST Part II BBS take the same Papers as NST Part II Psychology Single Subject (see below).

NST Part II Psychology (Single subject)

All single subject students must offer a Research Project, which must not exceed 7,000 words, excluding appendices, footnotes, and bibliography (see below).

Students can also choose to offer an optional dissertation on any topic that particularly interests them (see below).

NST Part II BBS: Major Subject Psychology

If you are studying psychology within the BBS Part II, you do not submit a research project. You do, however, have to submit a dissertation on a topic of your choice. Your dissertation can either be on a topic in psychology or a topic in your Minor subject. The arrangements for doing a dissertation on a topic in psychology within the Department of Psychology are as follows: A list of dissertations offered by the department is circulated at the start of the Michaelmas Term. Students then submit a ranked list of preferences and are assigned to a dissertation. Dissertation allocation is based on the dual aims of maximizing student satisfaction and balancing staff workload. In case you have a specific interest in a topic not covered by the list, you may propose the dissertation topic yourself. You should then approach a potential supervisor and gain their agreement to supervise you.

You must obtain approval from the Course Organiser, Dr Bozic, of the proposed title and subject of your dissertation *by 4.00 pm Monday 9 November*. Further instructions on the process will be made available by the BBS office in due course.

BBS students may attend any of the Psychology lecture courses, although there may be clashes between some lecture courses and certain Minor subjects, and students should check the timetables carefully. A list of compatible combinations of BBS major and minor subjects can be found [on the BBS website](#).

PBST Part II: PBS 9 and PBS 10

The Cognitive and Experimental Psychology paper is examined in PBS 9, and the Behavioural and Cognitive Neuroscience paper is examined in PBS 10.

PBST students may take either or both of PBS 9 or PBS10.

Supervisions

Supervisions are the responsibility of College Directors of Studies. Your Director of Studies will advise you about which lecture courses to attend, the number of supervisions you should have, the optional dissertation (where relevant) and on how to prepare for the examination. It is their responsibility to arrange your supervisions. However, in practice this is often achieved directly via the lecturer and members of their research group. Lecturers will announce the supervision arrangements in their first lecture or lecture handout on their courses. Part II supervisions are much less frequent than those in Part I (1 to 1.5 a week is typical) and should be based on much more substantial reading and private study on your part than in Part I.

British Psychological Society Accreditation

NST Part II Psychology (Single Subject) is part of a course of study accredited by the British Psychology Society (BPS). The accredited course requires students to take NST IB Experimental Psychology and NST Part II Psychology. A bachelor degree awarded at second class and above together with a pass mark for the research project on this course allows one to apply for accredited post-graduate professional training in clinical, educational and occupational psychology without taking the BPS graduate qualifying examination.

NST Part II BBS Major Subject Psychology is not part of a BPS accredited course.

Research projects (NST Part II Psychology Single subject and PBST Part II)

Choosing a project

Students choose their project from those offered in a prospectus of project descriptions, issued prior to the beginning of Michaelmas Term.

The role of the student

The project provides you with an opportunity to engage in aspects of research. COVID restrictions currently prevent standard collection of data in the laboratory this year, but students will still be able to get direct experience of research - analysing and interpreting datasets collected by department laboratories prior to lockdown, or collecting new data remotely. Students are encouraged to contribute to discussions about experimental design and to conduct their own independent reading of relevant material. Some projects may require you to master new techniques, and supervisors will provide you with initial guidance, after which you should aim to work more independently. Although your supervisors will be available to provide guidance, you will be expected to set up and organize the experiments, collect the data and conduct the statistical analyses of data yourself. A special course is organised in the Michaelmas Term covering the statistics necessary for analysing project data. While most projects are collaborations between a pair of students (or more), you must submit an independent report of the study. A class will be available at the end of Michaelmas Term to provide guidance on how to write up the research project. A sample of successful past projects is available for inspection in the Departmental Library.

The role of the supervisor

Your supervisor will initially provide you with references for preliminary reading, and encourage you to conduct further independent library research. They will provide you with guidance regarding the technical

aspects of the projects and will be available for consultation during the project when you should need it. They will provide guidance on the statistical analysis of the data, although you are expected to conduct the actual analyses yourself. Supervisors will be available for you to discuss your ideas about the structure and content of your project report before you write it up and provide guidance where needed. The format should be roughly that of a typical research paper in Psychology. The supervisor is permitted to read and comment on **one draft** of the project report. Students must not solicit advice on their drafts from other individuals in the department.

The Optional Dissertation (NST Part II Psychology Single subject)

For students who become particularly interested in a topic and would like to study it in depth, the option is available to write a literature review and critical commentary on an area of research *different* from that of the research project. It does, of course, involve additional work, some of which may be carried out during the Christmas vacation. If the dissertation attracts a higher mark than the lowest (second class) mark in written Papers 2, 3 or 4, then the Examiners will substitute the dissertation mark for that mark. The dissertation mark will not substitute for a third-class or failed exam mark. Students considering the optional dissertation are strongly recommended to identify a dissertation supervisor. Typically, a supervisor will provide pointers to the literature at the outset, comment on a *single* draft of the dissertation at the end, and answer queries in between. Single-subject Psychology Students are welcome to make use of the BBS list of dissertation titles to gauge the research interests of members of the Department.

The title of the dissertation must be submitted to the Senior Examiner for approval not later than the end of Michaelmas Term preceding the examination, **Friday 4 December 2020**. There is no form for this purpose; an email to the Senior Examiner will suffice. A title will not normally be approved if the fields of the research project and the dissertation overlap. Our working rule is that the project and dissertation would not be expected to share references other than statistical ones.

Assessment: The Tripos Examination

Written Papers

There are four papers in total, and students are required to answer three questions on each paper.

Paper 1: Methods of Inquiry

Paper 1 is sub-divided into three sections, one question to be answered in each;

Section A: Statistics

Section B: Methodology and experimental design

Section C: Essay questions that address conceptual and historical issues. These require candidates to synthesize information from different branches of the subject, or to discuss the history and philosophy of psychology. In this section, you have the chance to write about one of the grand issues of cognitive and behavioural neuroscience (e.g. Are objects and concepts represented in the brain by the activities of single cells? In what sense can animals think? How far is our behaviour influenced by our evolutionary history?). A series of lectures on Conceptual and Historical Issues in Psychology are scheduled separately from the Section lecture courses, to assist in the preparation of these questions.

The remaining three papers examine the lecture material from the course.

Paper 2: Cognitive & Experimental Psychology

Paper 2 is sub-divided into sections, each section corresponding to a single 8-lecture course. **Three questions must be answered in total and NO MORE THAN ONE question from each section.**

Paper 3: Behavioural & Cognitive Neuroscience

Paper 3 is sub-divided into sections, each section corresponding to a single 8-lecture course. **Three questions must be answered in total and NO MORE THAN ONE question from each section.**

Paper 4: Social Psychology, Developmental Psychology and Individual differences

You will choose one Paper chosen from the ones offered in Part II of the PBS Tripos: PBS 6 Developmental Psychopathology **OR** PBS 7 Advanced Topics in Social Psychology **OR** PBS 8 The Family.

PBS 6 and PBS 7 Papers are sub-divided into a number of 8-lecture courses. **Three questions must be answered in total and NO MORE THAN ONE question from each section.**

PBS 8 Paper requires ANY three questions to be answered from the set of questions provided.

The Research Project

The research project attracts 20% of the marks available in the examination. The final independent report of the Research Project must not exceed 7,000 words, excluding appendices, footnotes, and bibliography. The final report must be submitted by 12.00 pm *on the second Thursday of the Full Easter Term (4 May 2021)*. Further details on the submission process will be made available in the Project Guide.

The Optional Dissertation (single subject Part II Psychology only)

Two copies of the completed optional dissertation should be submitted to the Senior Examiner c/o Reception in Psychology by 12.00pm on the fifth Monday of the Full Lent Term (**22 February 2021**, i.e. the Monday following Reading Week). The dissertation should not exceed 8,000 words in length of text (excluding tables, references and footnotes).

Reading Week

In the middle of Lent term, we provide you with a 'Reading Week' (**15 – 19 February 2021**), a week without lectures that affords you the opportunity to catch up on reading, writing and project work. To enable us to accommodate 8-week lecture courses, we start Lent Term lectures on Monday 18th January, i.e. the day before Full Term starts, and finish them on the last day of Full Term. Please note that Paper 3 lecture courses and one or two other courses continue during reading week.

Student Input to Teaching and Course Management

We highly value your evaluation of all aspects of our teaching, the way the course is run and the facilities we provide. With your feedback, we can develop, expand and modify our teaching provision.

Questionnaires

At the end of each lecture course you will receive an email announcing a web-based questionnaire concerning the course. Please click on the link in the email and complete the short questionnaire, rating and commenting on various aspects of the course and associated supervisions. Please note that your reply is entirely confidential and no one can identify the author of a particular comment. However, please remember that the process is totally automatic so that the lecturer concerned will see the precise words that you have written. Numerical data and comments from these questionnaires are discussed by the Staff/Student Committee in their meetings. You will also be invited to complete a final questionnaire at the end of the year.

Staff/Student Committee

This consists of the Deputy Head of Department (Teaching), Part II Course Director, the Part IB Course Organiser, the PBS Tripos Course Director, and student representatives from NST IB, MVST IB Option course, NST Part II Psychology and NST Part II BBS.

The main purposes of the Committee is 1) to receive feedback and questions from students which we answer and discuss and provide further comments and suggestions on our courses and Departmental arrangements for students and 2) to report these matters to all our lecturers at the next Departmental Staff meeting. The Committee normally meets in week six of Michaelmas and Lent Terms. The Secretary of the Committee is the Teaching Administrator. Anyone wishing to have an item of business discussed should contact teaching@psychol.cam.ac.uk or the appropriate student representative.

Other channels. Students are encouraged to bring suggestions about the teaching or management of the Part II Course to our attention via the Head of Department, the Deputy Head of Department (Teaching), the Course Organiser or through their College Director of Studies. In the Easter Term, as supervisions end, Directors of Studies and supervisors are circulated with a request to comment on our courses. This provides another route by which your reactions to our courses can influence our future provision.

Induction Session

On **Thursday 8 October 2020**, we will hold an Induction Afternoon to welcome new Part II students to the Department. The afternoon will start at 3pm with a welcome talk from the Part II Course Organiser, Dr Mirjana Bozic, and a general introduction to the Department and its staff, who will help and guide you during your year with us. The Deputy Head of Department, Dr Kate Plaisted-Grant, will give an overview of the NST Part II course at 4pm.

Facilities for Part II students

Regardless of which Part II course involving Psychology you are enrolled on, we welcome you to use the facilities we provide for undergraduates. We would like you to feel that the Department provides a base for your Part II year. Unfortunately due to the space constraints of the Department, we cannot re-open some of these facilities at the moment in a COVID-secure manner. We will continue to monitor and respond to the changing public health situation.

Library

Although Part II students usually enjoy 24-hour access to the Department Library, during COVID crisis, the **physical library** (which is located on the first floor of the Psychological Laboratory) **is closed during Michaelmas term**. Our Librarian, who is on hand to help during normal working hours, is happy to provide support on literature searching and reference management via **Microsoft team or anonymous LibChat** available on the library website. We are also providing [online sessions with the School of Biological Science](https://libguides.cam.ac.uk/psychology-guide/skillstraining) (<https://libguides.cam.ac.uk/psychology-guide/skillstraining>).

The Library offers resources on your reading material recommended in this guide (electronic resources and hardcopy available with Click and Collect).

The Library Subject Guide (Libguides) gives further information about the Library resources, providing links to teaching resources and to electronic resources. <https://libguides.cam.ac.uk/psychology-guide/home>.

Library Services during COVID-19

The physical library is closed in Michaelmas, but we are offering the click and collect service, scan and delivery and you can find many ebooks from your reading list available. If you need an electronic resource not available in Cambridge, please contact our library library@psychol.cam.ac.uk. [Visit the library website](https://www.library.psychol.cam.ac.uk/using-the-library/library-services-during-covid-19) (<https://www.library.psychol.cam.ac.uk/using-the-library/library-services-during-covid-19>) for

updates on the services provides. The librarian and teaching office will also send regular emails with any changes

Library Committee

A Part II student is asked to join this Committee, which consists of teaching officers, a graduate representative, the Secretary of the Department and the Librarian. Its main business is the selection of books and journals for the Library, and the consideration of general Library use and facilities. To volunteer to join the Committee, please talk to the Librarian.

Green Challenge

The Department of Psychology holds a Gold Green Impact award and is committed to reducing its impact on the environment by saving energy and minimizing waste. You will see throughout the department a number of recycling bins provided for paper, cardboard, plastic, cans and tins and would encourage all students to use these and to be considerate of switching off lights, reducing waste etc.



If you would like to get more involved, here's how:

Keep up-to-date with news and opportunities by [subscribing to the Greenlines newsletter](#).

Visit the [Environment and Energy Section's student webpage](#) to find out more about projects including Green Impact and the [Living Laboratory for Sustainability](#).

Email environment@admin.cam.ac.uk with any questions or to find out more about any particular opportunity.

[Opportunities](#) include paid [internships](#), support running your own environmental project, and Institute of Environmental Management and Assessment (IEMA) accredited auditor training and experience through [Green Impact](#).

Scanning, Printing and Photocopying

Note that given the need to consider environmental issues and given increasing use of electronic devices by students, lecture handouts will no longer be printed. Lecture handouts will be posted online well in advance of the lectures. Please do try to use electronic means rather than paper.

However, we do provide a scanner/printer/copier available for your use, should it be absolutely necessary. The machine is situated in the Student Computer Room, next door to the Library. The printer charges printing jobs to your Desktop Services 'Common Balance' at a cost of 7p per page. The machine can also be used to scan items and either email them or save them to a USB data stick.

Seminar Series

The Department hosts a number of seminar series, which you are very welcome to attend to extend your knowledge of current research in Psychology and Neuroscience. They are currently all taking place online.

The **Zangwill Club**. Normally held Fridays at 4.30 pm, but the day of the week and time of day do vary so please check in advance. This seminar is held in the Departmental Lecture Theatre. This is our general Departmental seminar series with speakers normally coming from outside the Department.

The **Craik Club**. Held lunch times, with the venue and day of the week being variable. Local and visiting speakers on visual science, motor systems and other neurobiological topics.

The **Chaucer Club**. These seminars are held at the MRC Cognition and Brain Sciences Unit in Chaucer Road on Thursdays at 3.30 pm. The talks are usually given by visiting speakers. More information is available on the [Chaucer Club website](#).

The **Wednesday Lunchtime Seminars**. These are also held at the MRC Cognition and Brain Sciences Unit in Chaucer Road on Wednesdays at 12.30 pm. More often than not the speakers are from within Cambridge. More information is available on the [Wednesday Lunchtime Seminars website](#).

The **Behavioural and Clinical Neuroscience Seminars**. These are held lunch times at 1.00 pm, usually on Mondays. In-house and occasional visiting speakers.

The **Social and Developmental Psychology Seminars**. The SDP Seminar Series is a bi-weekly seminar. These are talks by invited speakers from the UK and Europe. Seminars take place on alternate Tuesdays at 1 pm, the first on Tuesday 11th October.

Departmental notice boards will contain details of these seminar series, and full listings of University talks are available on the [talks.cam website](#).

Health and Safety in the Department

The Head of Department is responsible for health and safety provision. You should ensure that you familiarise yourself with the various fire exits and routes to them: all are clearly signed. For areas that you do not visit frequently (e.g. a supervisor's office) the members of the Department that you are visiting will be happy to show you the emergency exits if you ask. In the event of the fire alarms sounding, you should leave the building immediately by the nearest safe exit and assemble outside the Department of Geography. Do not delay to collect your belongings and do not use the lift.

If you are unfortunate enough to have an accident in the Department, a first-aider can be contacted via Reception (telephone 01223 333550). If Reception is closed, contact should be made with the security control room (telephone 01223 331818). Any accident must be reported to the Departmental Office (Room 100). In case of serious emergency, telephone **999** for the Emergency Services.

When you start work on your project, your supervisor will inform you of any health and safety rules relating to the lab in which you will be working and you must obey these. If your project involves the use of animals, there are specific health and safety rules that apply in the animal house. You will be introduced to the animal house manager, who will explain those rules.

If you have any general concerns about safety in the Department, please contact the Departmental Safety Officer, Prof Jeff Dalley (jwd20@cam.ac.uk).

Careers in Psychology

There will be a set of Psychology Careers Talks on Thursday 22 October at 2pm and 6.30pm. The 2pm talks will address careers in research and in professional branches of psychology, and the postgraduate training required for these, and the 6.30pm talks will address further postgraduate study. You are strongly advised to give some thought to subsequent studies or employment possibilities during the year. There is more information available on the NST Part II Moodle pages.

Lecture Courses

The following provides details of the lecture courses. In order to access all the information available about lectures, examinations, archived material etc, make sure you are registered on our Moodle Site. If you have difficulties registering on the site, please contact the Teaching Office (teaching@psychol.cam.ac.uk).

Due to the effects of the Covid-19 pandemic, we have had to make changes to the way we deliver our programme in order to mitigate against risks to health and to give you the best possible academic experience in the circumstances. All lectures in 2020-2021 will be delivered online. They will be delivered at the timetabled slots and ALL lectures will be recorded and available for the course of the year. We expect all students to attend the lectures remotely as a group, in the same way they usually attend lectures in the lecture theatres. Some courses will include pre-recorded lectures only, while others will also include various additional tasks, group work, and 'live' video-streamed sessions. Organizers of each individual course will communicate their planned teaching method via Moodle.

Suggestions for preliminary reading are provided with the summary of each lecture course below, or on Moodle. The Lecture Timetable is available on [the Moodle page](#) and the [Online Timetable](#).

- 1) General sessions
- 2) Paper 1: Methods of inquiry
- 3) Paper 2: Cognitive and Experimental Psychology
- 4) Paper 3: Behavioural and Cognitive Neuroscience
- 5) Paper 4: Chose **either** Social Psychology, Developmental Psychology and Individual Differences

General Sessions

General Introduction

Dr K Plaisted-Grant, Michaelmas

1 lecture

This is a general introduction to Part II Psychology, covering general issues such as Lectures, the Tripos Examination, Supervisions, Research Projects and Dissertations.

Writing a Research Project

Dr D Szucs, Michaelmas

1 lecture

This class is for those who will be conducting a research project during the year. Guidance will be given on how to write up the report on your Part II Research Project. You are encouraged to ask questions if answers to them are likely to be helpful to other members of the Part II class, but questions concerning issues very specific to your own project are best directed to your project supervisor or co-ordinating supervisor.

Recommended Reading:

Sternberg, R.J., & Sternberg, K. (2010). *The psychologist's companion: A guide to writing scientific papers for students and researchers* (5th ed.). Cambridge: Cambridge University Press.

Paper 1: Methods of Enquiry

Statistics: On-Line Course

Created by Dr S van der Linden (on sabbatical 2020-21)

This **flipped classroom** course has two aims. First, to prepare for the compulsory statistics component of the examination, which may require analyses to be conducted with pen, paper and a hand-calculator. Second, to teach the theory required for understanding the quantitative analysis of a research project using a computer package. NB Although this course will teach you how to perform various statistical tests and why, it does not provide individual teaching of the statistics involved in a particular project. For help with the analysis for your particular project, you **MUST** consult your project supervisor.

The course covers theory, including worked examples of exam-style questions, and practical exercises allow the techniques to be practised, both by hand and using SPSS on the computer. The first half of the course will cover the basics of quantitative analysis (much of this will be revision for students who have studied part I NST or PBS 5): Exploratory Data Analysis; confidence intervals and effect sizes; hypothesis testing & significance; t tests; Pearson's χ^2 ; correlation; linear regression as an ANOVA model. The second half of the course focuses on Analysis of Variance: One-way analysis of variance and the multiple comparison problem; introduction to factorial ANOVA and interactions; repeated measures ANOVA, ANCOVA, and multiple linear regression. The course will focus upon the correct interpretation of ANOVA tables and related SPSS computer outputs.

The **self-study** online course materials are available [on Moodle here](#).

Although there are no lectures, Dr Andrew Thwaites (acqt2@cam.ac.uk) will be providing stats surgeries if you have questions, which you can sign up for via Moodle. Please prepare and submit specific questions in advance on Moodle before contacting Dr Thwaites.

Suitable Textbooks:

Gravetter, F.J., & Wallnau, L.B. (2012). *Statistics for the behavioral sciences* (9th ed.). Belmont, Calif.: Wadsworth Cengage Learning. [Earlier editions are also acceptable. Covers same material, to the same level, as this course.]*

Howell, D. (2013). *Statistical methods for psychology* (8th ed.). Belmont, Calif.: Wadsworth Cengage Learning. [Fifth or later edition may be used. Slightly more advanced, with considerably more detail, especially on ANOVA methods, than you need for this course & exam; may be a useful resource for analysing research project data.]

Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. Thousand Oaks, CA: Sage [useful practical guide to doing statistics using SPSS].*

Cumming, G. (2013). *Understanding the new statistics: Effect sizes, confidence intervals, and meta-analysis*. Routledge: Taylor and Francis [useful overview of latest recommendations in reporting statistics].

Experimental Design

Prof J Simons, Michaelmas

1 lecture

This session will present an overview of the fundamentals of experimental design, with a focus on preparation for the relevant component of the Part II NST examination. The session will start with presentation of key notions (dependent vs independent variables, confounding variables, ethical considerations), and continue with discussion of approaches to specific questions.

Recommended Reading:

Dunbar, G.L. (1998). *Data analysis for psychology*. London: Arnold (Ch 12).

Dyer, C. (2006). *Research in psychology: A practical guide to methods and statistics*. Oxford: Blackwell (Ch 5).

Conceptual and Historical Issues in Psychology

Co-ordinator: Dr L Cheke, various lecturers, Lent

6 lectures

The aim of these lectures is to provide some background and support to the exam questions on Paper 1, Section C, which require students to synthesize information from different branches of the subject, or to discuss the history and philosophy of psychology. An introduction to this course is on the Moodle site and gives some explanation of this question and how to approach it. The following lectures will explore topics that transcend a particular area of psychology to address broader conceptual or methodological issues, or the historical background that helps contextualize the way psychology is done today. While the exam questions will not be drawn exclusively (or perhaps at all) from the specific topics covered in these lectures, the lectures will provide some examples of movements and conceptual controversies in psychology that might not fit under one specific subject category, and thereby give an example of the type of approach that will be useful in answering exam questions. The likely format of these lectures this year will be a pre-recorded lecture of around 40 minutes-1 hour, followed by live discussion for 30-60 minutes, depending on the lecturer.

The order of lectures is not fully finalised. But will include the following lectures:

1. Dr Lucy Cheke "Introduction to Conceptual and Historical Issues in Psychology", and "Mental Time Travel: Empirical measurement of an elusive phenomenon?"
2. Prof M Haggard: "Subjectivity" in Psychology: The practically important example of placebo effects
3. Dr Anna K Lee "Culturally Responsible Research in Psychology"
4. Dr T Bekinschtein: "Dissociation between perceptual performance and metacognition"
5. Prof M Haggard: "Psychology's long-term relationship with extreme empiricism: Locke to the Replication Crisis"
6. Prof J Mollon: "How does the brain work?"

Paper 2: Cognitive and Experimental Psychology

Language, Mind and Brain

Dr M Bozic and Prof U Goswami, Michaelmas

8 lectures

Language is a uniquely human communication device, which allows us to express an infinite number of messages and ideas. We learn and use language effortlessly, but this masks an extraordinary complexity of mechanisms that enable this to happen. This lecture course explores how we acquire language, and examines the neuro-cognitive processes and mechanisms involved in producing and comprehending language. In doing so, it combines models and experiments from psycholinguistics, speech and hearing sciences and cognitive neurosciences, aiming to show how they jointly contribute to our understanding of this key human capacity.

Recommended Reading:

Harley T. *The Psychology of Language: From Data to Theory*. Psychology Press. (3rd/4th edition)

Goswami U. (Ed.) *Handbook of Childhood Cognitive Development*. Blackwell. (2011)

Gazzaniga MS, Ivry RB & Mangun GR. *Cognitive neuroscience: The biology of the mind (4th/5th ed)*. New York: W.W. Norton and Company

Pinker S. *The Language Instinct*. Penguin. (2000)

Kroll JF. & DeGroot AMB (Eds). *Handbook of Bilingualism: Psycholinguistic Approaches*. OUP. (2005)

Vision (with occasional references to Hearing)

Prof J D Mollon, Michaelmas

8 lectures

Should the visual system be considered as one sense organ or as several? To what extent are the different attributes of the visual array - such as movement, form, colour, texture, depth - extracted by anatomically distinct channels in the visual pathway and analysed by separate cortical areas? These questions are recurrent themes in the course. The lectures consider each attribute of the image in turn, but also examine how the attributes are integrated in normal perception and dissociated in cases of brain damage. The old idea of 'two visual systems' was abandoned several years ago: current evidence suggests that >18 parallel channels leave the retina, each genetically pre-specified in exquisite detail and each projecting to a distinct site within the brain. A second theme of the lectures is that to understand the visual system we must consider how it evolved and we must analyse the tasks that face it in the natural world. Evidence is drawn from psychophysics, neuropsychology, and molecular biology. In the past, these lectures were illustrated with live demonstrations: it is hoped to make such demonstrations available to interested students this year.

Recommended Reading: (* suitable for reading in advance of the module):

Dowling & Dowling (2016) *Vision. How it works and what can go wrong*. MIT Press [Bland prose, but very clear and definitely authoritative] * (on-line)

Morgan, M.J. (2003). *The space between our ears*. London: Weidenfeld & Nicholson [Very readable, and more cognitive. Reprinted 2005 by Oxford University Press]. *

Frisby, J.P., & Stone, J.V. (2010). *Seeing: The computational approach to biological vision (2nd ed.)*. Cambridge, Mass: MIT Press. [Recommended introduction] *

Wolfe, J (2018) *Sensation and Perception*, 5th Ed., Sinauer

Rodieck, R.W. (1998). *The first steps in seeing*. Sunderland, Mass.: Sinauer. [A book that isn't dating. Especially recommended to PNB students]

Mollon, J. D. (2003) in Shevell, S. K. *The science of color* (2nd ed.). Elsevier. Ch 1 (on-line)
Entries by Baden, T. and by Shapley, R. in *Oxford Research Encyclopedias. Neuroscience*. (on-line)
Papers by Hurlbert, Jordan, Bosten (2019) in last December's issue of *Current Opinion in Behavioral Sciences*. (on-line)

Psychology and Neuroscience of Human Emotion

Dr D Talmi, Michaelmas

8 lectures

There is burgeoning folk and scientific interest understanding what people feel, and what drives people to feel the way they do. Yet it is difficult to study this topic scientifically, because we cannot observe, or measure, emotions directly and objectively. Moreover, emotions vary widely within and across individuals. In fact, although the dictionary gives us a ready definition of the word 'emotion' in the English language, there are disagreements about the scientific definition of this term. Competing theories inspire different kinds of experiments and emphasize different aspects of the data.

This lecture course focuses on the link between emotion theories and emotion data with the overall aim of giving students the knowledge, skill, and confidence to interpret emotional phenomena in the world around them. We will explore the main theoretical frameworks in the scientific study of emotion, compare and contrast them, and critically evaluate their empirical evidence base. We will examine varied pieces of laboratory research, and evaluate how well available data supports or challenges the theories. Because emotion is unobservable, the experiments we will study include a rich set of indices of emotion, from behaviour to physiological and neural markers.

Our journey through emotion research will touch on fundamental questions such as: How many emotions are there? Are emotions innate or learned? Are they universal or culturally determined? How are emotions related to bodily sensations and expressions of the face, voice or body? What is the role of 'thinking' in 'feeling', and of 'feeling' in 'thinking'? Does damage to the body or the brain alter the emotional experience?

Recommended reading:

Fox, E. (2008). *Emotion Science: An Integration of Cognitive and Neuroscientific Approaches*. Palgrave Macmillan.

Computational Approaches to Cognition

Dr P Bays and colleagues, Lent

8 lectures

These lectures address the cognitive operations the brain must carry out in order to extract information from the senses, maintain it in memory, evaluate evidence to decide on actions, and send signals to the motor system to carry them out. A central challenge for the brain is randomness, both in the form of unpredictability in the external world and "noise" that corrupts signals in the neural system. Crucial insights have come from considering optimal strategies to cope with this randomness: What is the best way to use ambiguous sensory input to interpret one's surroundings? How can we make good decisions based on incomplete and unreliable evidence? How should we control our bodies' imperfect muscular system to best achieve movement goals? Once optimal rules have been identified, we will discuss how neurons might encode the information and carry out the computations needed to implement them. The lectures will cover some basic elements of probability theory that are important for the computational approach, but will not assume previous mathematical knowledge.

Recommended Reading

This online textbook provides useful background for the neuroscience aspects of the course:

O'Reilly R. C., Munakata Y., Frank M. J. & Hazy T. E. *Computational Cognitive Neuroscience*, 4th Edition. The latest edition is hosted on Github (at <https://github.com/CompCogNeuro/ed4>). You can download it via this link: <https://bayslab.com/ccnbook>

From Brain to Cognition

Dr T Bekinschtein and colleagues, Michaelmas

8 lectures

Are the brain measures a reflection of a cognitive process? How does a psychological construct relate to its alleged neural correlate?

This series of lectures aims at building cognitive concepts and models of how we think in a data-driven manner. In cognitive neuroscience (in psychology) we normally observe a phenomenon, start to make inference about it, and propose hypotheses, hopefully within a theoretical framework. It is common to look for neural correlates and neural networks involved in a psychology phenomenon, but unfortunately the interpretation surrounding the neural correlates of a phenomenon helps less than expected and may undermine the psychological processes that seem to represent neurally. Through a series of neurocognitive principles and effective examples, we will evaluate how is it possible to derive cognitive constructs from neural patterns, aiming to understand the direction of inferences and build from brain to cognition.

The lectures:

L1 - Intro and the use of models to understand how we think

L2 - Linking Brain Dynamics to Cognition and Consciousness

L3 - Connectivity for Verbal processing and consciousness detection

L4 - Not-Marr data-driven from behaviour to neural connectivity and back

L5 - Reading and reproducing mental contents

L6 - Internally Generated aspects of Thought, Perception and Experience

L7 - Information theory for tri-variate measures: sampled stimulus, neuroimaging signals and participants behaviour

L8 – Theories brings us together by setting us apart, the curse of the frame in data

Human Memory: Cognitive, Neural and Clinical Perspectives

Prof J Simons and colleagues, Lent

8 lectures

This set of lectures will consider evidence relating to a number of theoretical distinctions that have been proposed within human memory, focusing in particular on long-term episodic and semantic memory. In each case, evidence from a variety of sources will be discussed, including cognitive experiments involving healthy individuals, neuropsychological studies of patients with brain lesions, and functional neuroimaging investigations. The objective will be to achieve an understanding of the cognitive and neural mechanisms responsible for different aspects of remembering. We will also consider human memory from a clinical perspective: how well do the patterns of difficulties and strengths exhibited by patients in the memory clinic map onto the theoretical distinctions described? How do models of memory inform assessments and help make diagnoses, and can we try to help people to cope with their memory difficulties?

Main Readings:

Baddeley, A. (1997). *Human Memory: Theory & Practice*. Psychology Press.

Eysenck, M. & Keane, M. (2015). *Cognitive Psychology: A Student's Handbook*. Psychology Press.

Hodges, J. R. (2007). *Cognitive Assessment for Clinicians*. Oxford University Press.

Ward, J. (2015). *The Student's Guide to Cognitive Neuroscience*. Psychology Press.

Synaptic Plasticity, Engrams and Memory

Dr E Cahill, Dr C Heath and Dr J Kanen, Lent

8 lectures

These lectures consider memory at multiple levels of analysis, with a strong emphasis on cellular-level and circuit-level mechanisms informed by studying memory in animals. We will consider the insights that can be gained by studying memory using cutting-edge techniques in animal models and how these complement studies in humans, before presenting the leading theories of how memories are stored and represented within the brain at the cellular-level. We will discuss how different types of memory are supported by different memory networks and neural structures, and how these may change over extended periods of time through systems-level consolidation. Finally, we will conclude by considering how our understanding of memory can be leveraged to enhance or disrupt memory in neurological and mental health disorders.

This course will be most readily accessible to those who have previously studied NST 1b Neurobiology or MVST 1b Neurobiology and Human/Animal Behaviour. For those who have not, we recommend the preparatory reading suggested below.

Recommended Reading:

Preparatory reading:

Purves et al. (2001) *Neuroscience*, 2nd ed. Sunderland (MA): Sinauer Associates. Chapters 2-8. **OR** Purves et al. (2004) *Neuroscience*, 3rd ed. Sunderland (MA): Sinauer Associates. Chapters 2-7.

Textbooks and background reading:

Kandel, E.R. (2007). *In search of memory: The emergence of a new science of mind*. New York: W.W. Norton.

Ward, J. (2010). *The student's guide to cognitive neuroscience* (2nd ed.). Hove: Psychology Press.

Gazzaniga, M.S., Ivry, R.B., & Mangun, G.R. (2013). *Cognitive neuroscience: The biology of the mind* (4th ed.). New York: W.W. Norton and Company.

Gazzaniga, M.S. (2014). *The cognitive neurosciences* (5th ed.). Cambridge, Mass.: MIT Press (more advanced than Gazzaniga, Ivry & Mangun).

Kandel, E.R., et al. (2013). *Principles of neural science* (5th ed.). New York: McGraw-Hill.

Squire, L.R., et al. (Eds.). (2012). *Fundamental neuroscience* (4th ed.). Amsterdam: Elsevier.

Articles:

Vervliet, B. and Raes, F. (2013) Criteria of validity in experimental psychopathology: application to models of anxiety and depression. *Psychological Medicine* 43: 2241-2244.

Belzung, C. and Lemoine, M. (2011) Criteria of validity for animal models of psychiatric disorders: focus on anxiety disorders and depression. *Biology of mood and anxiety disorders* 1: 9.

Schmidt, M.V. (2011) Animal models for depression and the mismatch hypothesis of disease. *Psychoneuroendocrinology* 36: 330-338.

Steimer, T. (2011) Animal models of anxiety disorders in rats and mice: some conceptual issues. *Dialogues in Clinical Neuroscience* 13(4): 495-506.

Visual Cognition

Dr G Davis, Lent

8 lectures

Human vision transforms information from the retina into representations of surfaces, objects and illumination. However, while the retina can code many object images at once, conscious perception seems to reflect only a few of these objects– those to which we pay attention. This course discusses research on visual attention and its relationship to aspects of human vision. It is anticipated that the course will comprise 8 lectures, including some demonstrations.

Recommended Reading:

Chen, Z. (2012). Object-based attention: A tutorial review. *Attention, Perception, & Psychophysics*, 74(5), 784-802.

Wolfe, J., & Robertson, L. (Eds.). (2011). *From perception to consciousness: Searching with Anne Treisman*. Oxford University Press.

Learning and Brain Plasticity

Prof Z Kourtzi, Lent

8 lectures

Human behaviour adapts to the statistical structure of the environment: we can play tennis with a friend's racket, adjust to a new pair of spectacles, separate friends from foe, and critically distinguish brands of cola. This course examines the processes by which the brain adapts to effect the best responses using knowledge from past experience and the senses. We will draw on work from experimental psychology, computational modelling, human brain imaging and animal studies to address recent advances and controversies on the following topics:

1. Structural and functional plasticity across the lifespan
2. Perceptual inferences and decisions
3. Learning to adapt to change
4. Perceptual learning: specificity vs. generalisation
5. Learning to categorize and visual expertise
6. Learning associations and complex skills
7. Learning without a teacher: statistical learning
8. Final revision and Q&A

Lectures will be delivered online including a live Q&A. Supervisions will be offered after reading week.

Essay titles for supervisions

- *Are priors hard-wired or can they be acquired?*
- *Are video games good for you?*
- *Does visual expertise require innate specialist brain circuits?*
- *Can you teach an old dog new tricks? Discuss learning ability in older age*
- *Is brain decline irreversible? Discuss brain plasticity in adversity*

Recommended reading:

Gazzaniga MS. (2004). *The Cognitive Neurosciences III*. MIT Press

Werner S. and Chalupa L.M. & (2013). *The new visual neurosciences*. MIT Press

Paper 3: Behavioural and Cognitive Neuroscience

Recent Advances in Research on Stress and Stress-related Disorders

Prof J Dalley, Dr M Lynall, Dr R Lawson, Michaelmas

8 Lectures

The term stress is widely used in everyday language but defining precisely what we mean by stress turns out to be anything but straightforward not least because different people often react in different ways to the same stressor. This module provides an up-to-date analysis of stress research from the Founder of stress theory – Hans Selye – to the critically important psychological concepts of coping and control. We consider the brain mechanisms that support adaptive stress responses that depend on homeostatic regulatory systems before discussing how chronic stress affects the structural and functional integrity of the brain, ultimately to affect social and cognitive functioning and the incidence of such stress-related disorders as obesity, depression and schizophrenia. The implications of new research on putative immunological mechanisms and the application of computational approaches to help interpret stress-related research will also be discussed.

Recommended Reading:

Arnsten AF (2015) Stress weakens prefrontal networks: molecular insights to cognition. *Nat Neurosci.* **18**: 1376-1385

McEwen B et al (2011) Stress- and allostasis-induced brain plasticity. *Ann Rev Med* **62**: 431-445.

Miller AH and Raison CL (2015) The role of inflammation in depression: from evolutionary imperative to modern treatment target. *Nat Rev Immunol* **16**: 22-34.

Comparative Cognition

Prof N Clayton, Dr R Miller, Dr G Davidson, Michaelmas

8 lectures

This course will cover research on animal learning, memory and cognition. A variety of topics will be discussed ranging from spatial learning and memory to folk physics and the extent to which problem solving can be explained by learning and memory or whether there is a need to invoke cognitive processes to explain aspects of this behaviour. Can animals reflect upon their thoughts? Can they reminisce about the past and imagine and plan for future scenarios? What might these issues reveal about the evolution of intelligence in animals more distantly related to us than our primate cousins?

Recommended Reading:

Pearce, J.M. (2008). *Animal learning and cognition: An introduction* (3rd ed.). Hove: Psychology Press.

Shettleworth, S.J. (2010). *Cognition, evolution and behavior* (2nd ed.). Oxford: Oxford University Press.

Emotion Regulation and Aberrant Motivation

Prof J Dalley, Dr D Belin, Michaelmas

8 lectures

The aim of this course is to present an advanced, up-to-date and critical assessment of emotion regulation and aberrant motivation that builds onto material covered in the previous two topics, namely Emotional and Cognitive Mechanisms of Preparatory and Consummatory Responses and Advances in Research on Stress. This course may also interest students of animal behaviour, learning theory, cognitive neuroscience, and biological aspects of abnormal psychology.

The course will first examine the notion of impulse control and its underlying monoaminergic mechanisms to further discuss what has been discovered about the neural mechanisms underlying interoception its influence on impulse control and other executive functions such as decision making. It will then delve into the neural mechanisms of frustration and coping strategies in adaptive and maladaptive conditions, e.g., in Obsessive-Compulsive Disorder. Capitalising on the understanding of the psychological and neural mechanisms of positive and negative reinforcement and that of the balance between goal-directed behaviours and habits, the course will then move on to examining our current understanding of Obsessive Compulsive Disorder and drug addiction as disorders of emotional regulation vs maladaptive engagement of learning mechanisms by aversive states or addictive drugs.

Recommended Reading:

Toates, F. (2011). *Biological psychology* (3rd ed.). Harlow: Prentice Hall.

Carlson, N.R. (2012). *Physiology of behavior* (11th ed.). Boston: Pearson.

Squire, L.R., et al. (Eds.). (2012). *Fundamental neuroscience* (4th ed.). San Diego: Academic Press. (Earlier versions should be consulted for more detailed chapters by Robbins & Everitt, and Koob.)

Koob, G.F., & Le Moal, M. (2006). *The neurobiology of addiction*. Amsterdam: Elsevier.

Feldman, R.S., Meyer, J.S., & Quenzer, L.F. (1997). *Principles of neuropsychopharmacology*. Sunderland, Mass.: Sinauer Associates.

Iversen, L.L., Iversen S., Bloom, F.E., & Roth R.H. (2009). *Introduction to neuropsychopharmacology* (1st ed.). New York: OUP.

Simpson & Balsam (Eds) (2016) *Behavioural Neuroscience of Motivation* (Springer)

Olatunji (Ed) (2019) *The Cambridge Handbook of Anxiety and Related Disorders*

Motivation: Emotional and Cognitive Mechanisms of Preparatory and Consummatory Responses

Dr D Belin, Michaelmas

8 lectures

The aim of this course is to present an advanced, up-to-date and critical assessment of brain mechanisms of motivation. This course may also interest students of animal behaviour, learning theory, cognitive neuroscience, and biological aspects of abnormal psychology. The course will examine what has been discovered about the neural mechanisms underlying motivation and learning using the classical techniques of physiological psychology, including lesioning, electrical and chemical stimulation, electrophysiological recording and in vivo monitoring of transmitter release. Particular emphasis will be placed on neuropharmacological advances which have implicated the monoaminergic, cholinergic and peptidergic neurotransmission in the control of behaviour. The course initially will be organised around two main topics: the re-assessment of the role of specific neurochemical systems and the hypothalamus in motivation; and the neural substrates of reward and punishment, focusing especially on obesity and drug addiction. Detailed topics will include: hypothalamic syndromes and homeostatic mechanisms underlying behaviour; the functional organization of the striatum and corticostriatal circuitries with an emphasis on understanding the neural and psychological mechanisms underlying reward and drug addiction; stress and arousal; neural mechanisms of aversive emotional learning, and cognitive enhancing drugs in neuropsychiatry.

Recommended Reading:

Toates, F. (2011). *Biological psychology* (3rd ed.). Harlow: Prentice Hall.

Carlson, N.R. (2012). *Physiology of behavior* (11th ed.). Boston: Pearson.

Squire, L.R., et al. (Eds.). (2012). *Fundamental neuroscience* (4th ed.). San Diego: Academic Press. (Earlier versions should be consulted for more detailed chapters by Robbins & Everitt, and Koob.)

Koob, G.F., & Le Moal, M. (2006). *The neurobiology of addiction*. Amsterdam: Elsevier.

Feldman, R.S., Meyer, J.S., & Quenzer, L.F. (1997). Principles of neuropsychopharmacology. Sunderland, Mass.: Sinauer Associates.

Iversen, L.L., Iversen S., Bloom, F.E., & Roth R.H. (2009). Introduction to neuropsychopharmacology (1st ed.). New York: OUP.

Behavioural Genetics

Professor J D Mollon, Lent

8 lectures

The first lecture considers two classical sources of evidence for the heritability of behaviour in normal populations: selective breeding in animals and twin studies in man. Subsequent lectures cover very recent work on the molecular genetics of intelligence, personality and other variations within the normal population. The last two lectures are devoted to schizophrenia and depression; and the lecture on the genetics of depression will be given by a world authority, Dr Na Cai (Munich).

Out of our total genome, a significant fraction of the total genes contribute to the construction, maintenance or operation of the CNS. Most of these genes are known to be polymorphic (i.e. the normal population contains different forms). But polymorphisms outside the coding regions of genes are actually proving to be of primary importance – i.e. cases where the protein is unchanged, but the polymorphism affects when, where, or how much the gene is expressed. There were early expectations that a few individual genes – notorious candidates were COMT, DRD4, SLC6A4 – would emerge that individually accounted for much of the variance in personality and IQ within the normal population. Few of these candidates have survived modern whole-genome association studies. There is no ‘gene for’ neuroticism or for intelligence (or for schizophrenia). However, direct estimates of the heritability of IQ from whole-genome studies give values in the range 0.25– 0.5, not far below those obtained from twin studies. And similarly, whole-genome association studies show schizophrenia to be substantially heritable. For personality, in contrast, the direct estimates are much lower than those from twin studies. Also to be discussed in the lectures are the epigenetic ways in which behaviour might be altered, and the factors that maintain balanced polymorphisms in a population.

Recommended Reading:

Parrington, J (2015) *The Deeper Genome*.* [a very readable way to catch up with molecular biology and with recent changes to the conventional views of genes]

Plomin (2018) *Blueprint* * or Mitchell, K. (2018) *Innate* * [alternative introductions to the molecular genetics of cognition.]

Knopik et al (2017). *Behavioral genetics* (7th rev. ed.). New York: Worth. [The nearest thing to a textbook for this rapidly moving field]

Duncan, L. E. (2019) How genome-wide association studies (GWAS) made traditional candidate gene studies obsolete. *Neuropsychopharmacology*, 44, 1518.

Adolescence

Prof SJ Blakemore and colleagues, Lent

8 Lectures

Adolescence is defined as the period of life between 10 and 24 years. Adolescence is a period of profound transition, and is associated with major hormonal, physical, social, behavioural, cognitive and neural change. This is a developmental stage of life in which we gradually develop a sense of self-identity, and acquire the necessary skills and life experiences to become an independent adult. Neuroimaging studies have demonstrated that the human brain undergoes substantial and protracted structural and functional change during adolescence. These neurodevelopmental changes have been related to the development of social, emotional and cognitive processes. Adolescence has been proposed to be a sensitive period of development, rendering it a stage of both vulnerability to mental illness and opportunity for learning, creativity and the positive effects of cognitive and therapeutic interventions.

This paper will cover the development of the brain, cognition and social-affective processing in adolescence, as well as cultural influences on adolescent development, the effects of social media on adolescent wellbeing, and interventions for mental illness in adolescence.

Lectures (order TBC)

1. Adolescence - definitions, culture, species, history (SJB)
2. Adolescent structural brain development (SJB)
3. Adolescent functional brain development (SJB)
4. Adolescent social brain development (SJB)
5. Adolescent cognitive development (SJB)
6. Adolescent mental health (Prof Tamsin Ford, Psychiatry, Cambridge)
7. Social media and adolescence (Dr Amy Orben, MRC CBU, Cambridge)
8. Adolescence from an evolutionary anthropological perspective (Dr Emily Emmott, UCL).

The evolutionary history of adolescence (with some paleo-anthropology perhaps), contemporary cross-cultural comparisons of adolescence (mostly case studies from small-scale societies), the function of adolescence, and finally the implications of it all (critique of the conceptualisations of adolescence in Western developed societies).

Brain Mechanisms of Psychosis

Prof P Fletcher, Lent

8 Lectures

The purpose of these lectures is to develop understanding of how computational and cognitive neuroscience approaches may offer insights to the complex changes in perception and belief that characterise mental illness, particularly psychosis. I will trace the development of some of the key theories and show how they have been tested and refined as well as identifying some of their important limitations.

Following these lectures, students should:

1. Understand the nature of predictive coding models of perception and inference and to see these in the context of basic ideas (derived from cybernetics and reinforcement learning) of the brain as a model of its world.
2. Understand the nature of psychotic experiences which are characterised by an apparent loss of contact with reality and by altered and seemingly bizarre perceptions, inferences and beliefs.

3. Understand how previous researchers have tried to make sense of psychosis psychosis and to consider the limitations of previous models
4. Consider more recent perspectives based on ideas of the brain engaging in prediction-based inference and understand how these inferential processes may be perturbed in a number of ways, both in illness and health.
5. Understand the principles of one of the prominent tools of human cognitive neuroscience: functional neuroimaging and, crucially, be able to evaluate and criticise the use of functional neuroimaging in mental illness, understanding its limitations as well as its potential.

Optional Papers: Social Psychology, Developmental Psychology and Individual Differences

NB You are required to pick one, and only one, of the following Papers. Each Paper runs across Michaelmas and Lent Terms. These Papers are borrowed from the Psychological and Behavioural Sciences Tripos. Further information on the papers can be found on the [PBS Part II Moodle page](#).

PBS 6: Development and Psychopathology

Course organiser: Prof. C Hughes (ch288@cam.ac.uk)

This paper will focus on four domains: 1) Understanding Development; 2) Conduct Disorders; 3) Risk and Resilience; and 4) Autism.

The examination for PBS 6 is sub-divided into sections, each section corresponding to a single 8-lecture course. Three questions must be answered in total and no more than one question from each section.

PBS 7: Advanced Topics in Social and Applied Psychology

Course organiser: Dr L de-Wit (lhd26@cam.ac.uk)

This paper contains three blocks of eight lectures, each focusing on a different area of social and applied psychology. The first focuses on geographical psychology, the study of how (and why) psychological traits differ across geography. The second focuses on applied behavioural insights to change behaviour. The third focuses on the psychology of social influence in a digital age. The PBS7 exam is divided into three sections, and students will need to answer one question from each section.

PBS 8: The Family

Course organiser: Dr S Imrie (si275@cam.ac.uk)

In addition to psychology, this interdisciplinary paper draws on material from sociology, social anthropology, law and other relevant disciplines. Psychological and social perspectives on family relationships and child development are examined in relation to specific topics such as motherhood, fatherhood, marriage, new family forms, cross-cultural perspectives, adolescence, family relationship breakdown, and family policy. Theories of family life are studied as well as methodologies of family research.