PSYC2011 – Brain & Behaviour

Unit of Study Code: PSYC2011

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Format of Unit: 3 x 1 hour lectures/week x 13 weeks
1 x 1 hour tutorial/week x 12 weeks

Credit Point Value: 6 Credit Points

Prerequisites: 12 credit points of First Year Psychology including PSYC 1001 and PSYC 1002

Assessment:

Classwork:
35% of total mark: 1,500 word Laboratory Report
Should involve 6 x 2 h of background library research
Due Date: Friday, 7th May (Week 9)

15% of total mark: 25 item multiple-choice quiz in week 13
In your normal tutorial class

Examination:
50% of total mark: 2/3 Multiple-choice questions; 1/3 Short answer questions

Evaluation of teaching:
Date: Week 13
Type: General Student Feedback Questionnaire
Unit of study general description:

This unit of study examines a range of phenomena and principles in learning and perception and their underlying neural substrates. The emphasis in learning is on instrumental conditioning and the principle of reinforcement, ranging from applications of this principle to its neural substrates. Also covered are analyses of aversive-based learning, such as punishment and avoidance, and anxiety, together with related neurochemical mechanisms and the effects of various psychopharmacological agents on these processes. A number of perceptual phenomena will be studied (e.g., vision and hearing, perception of pitch, recognition of odours). A series of practical classes and demonstrations allow students to gain hands-on experience of how some of these principles and phenomena may be studied experimentally.

Graduate Attributes and Student Learning Outcomes for Brain and Behaviour (Psyc2011)

This course is structured around the graduate attributes associated with the scientist-practitioner model, the basis for the training of psychologists in Australia and internationally. Graduate Attributes are the generic skills, abilities and qualities that students should acquire during their university experience and the School of Psychology is committed to providing an environment to promote these skills. In addition, this unit of study will provide students with generalised and transferable skills that will also be useful in careers outside psychology.

The following graduate attributes and student learning outcomes will be developed through lectures, tutorial and assessment activities in particular. They will be assessed primarily in the laboratory report and essay, and in the tutorial quiz and final examination.

1: Knowledge and Understanding of the Brain and Behaviour

Display basic knowledge and understanding the major concepts, theoretical perspectives, empirical findings, and historical trends in the study of brain and behaviour

Student learning outcomes:
(i) An interest in and appreciation of the historical and current contribution of learning theorists, neuroscientists, psychopharmacologists and sensory scientists to the understanding of the brain and behaviour and to the treatment of mental illness and neurological disorders.
(ii) Understanding basic properties of conditioning, especially instrumental learning.
(iii) Understanding the neurochemical bases of reinforcement, addiction, anxiety and depression.
(iv) Understanding basic processes of human visual and auditory perception and the vestibular system.
(v) Understanding comparative studies of complex learning, problem solving and memory.
(vi) Awareness of the relationship between theoretical research and practical applications of behavioural and physiological findings.
(vii) Ability to describe, explain and evaluate research studies in these fields.
(viii) Awareness, and some hands-on experience, of animal-based behavioural research.
(ix) Skill in reporting experimental work using standard conventions.

2: Research Methods in the study of Brain and Behaviour

Understand, apply and evaluate basic research methods in learning theory and psychopharmacology including research design, data analysis and interpretation, and the appropriate use of technologies.
Student learning outcomes:

(i) To develop a critical understanding of the major methods of research in these areas.
(ii) To critically assess the major theories and research findings in these areas.
(iii) To interpret statistical analyses.
(iv) Use basic web-search, word-processing, database, email, spreadsheet, and data analysis programs.
(v) Design and conduct basic studies to address psychological questions: frame research questions; undertake literature searches; critically analyse theoretical and empirical studies; formulate testable hypotheses; operationalise variables; choose an appropriate methodology; make valid and reliable measurements; analyse data and interpret results; and write research reports.

3: Critical Thinking Skills in the study of Brain and Behaviour
Respect and use critical and creative thinking, sceptical inquiry, and the scientific approach to solve problems related to the brain and behaviour.

Student learning outcomes:

(i) Demonstrate an attitude of critical thinking that includes persistence, open-mindedness, and intellectual engagement.
(ii) Evaluate the quality of information, including differentiating empirical evidence from speculation.
(iii) Evaluate issues and behaviour using different theoretical and methodological approaches.
(iv) Use reasoning and evidence to recognise, develop, defend, and criticise arguments and persuasive appeals.

4: Values in the study of Brain and Behaviour
Value empirical evidence; act ethically and professionally; and understand the complexity of sociocultural and international diversity.

Student learning outcomes:

(i) Use information in an ethical manner (e.g., acknowledge and respect the work and intellectual property rights of others through appropriate citations in oral and written communication)
(ii) Be able to recognise and promote ethical practice in research.
(iii) Promote evidence-based approaches and rigour in the understanding of behaviour.
(iv) Be aware of ethical issues pertaining to the use of laboratory animals in research.

5: Communication Skills in the study of Brain and Behaviour
Communicate effectively in a variety of formats and in a variety of contexts.

Student learning outcomes:

(i) Write a standard research report using American Psychological Association (APA) structure and formatting conventions.
(ii) Write effectively in a variety of other formats (e.g., essays, research proposals, reports) and for a variety of purposes (e.g., informing, arguing).
(iii) Demonstrate effective oral communication skills in various formats (e.g., debate, group discussion, presentation) and for various purposes.
(iv) Collaborate effectively, demonstrating an ability to work with groups to complete projects within reasonable timeframes; manage conflicts appropriately and ethically.
6: Learning and the Application of the studies of Brain and Behaviour
Understand and apply psychological principles to personal and social issues.

Student learning outcomes:

(i) To develop an awareness of the applications of the theories and research findings in Neuroscience, Psychopharmacology, Perception and Learning.
(ii) Apply psychological concepts, theories, and research findings to solve problems in everyday life and in society.
(iii) Understand major areas of applied psychology and neuroscience.
(iv) Understand how basic research in psychopharmacology and neuroscience gives rise to treatments for addictions, depression, anxiety disorders and neurological disorders.

Evidence of learning:

Achieving a Pass standard in the examination demonstrates success in achieving outcomes 1 – 6.
Successful achievement of Outcomes 1, 7 and 8 is shown by completion of the laboratory report at a Pass standard and of Outcome 2 and 5 by a Pass mark in the Tutorial Quiz.
SYLLABUS

Fundamental principles of instrumental conditioning based on animal research and their human applications, involving both positive and aversive events, and their neural and pharmacological bases; fear, anxiety and stress; applications of research on learning; comparative studies of cognitive processes; psychopharmacology of addiction and of anxiety; genetic basis of behaviour; human auditory, visual and tactile perception and underlying brain mechanisms.

LECTURE AND TUTORIAL TIMETABLE

<table>
<thead>
<tr>
<th>date</th>
<th>week</th>
<th>lecture#</th>
<th>Lecture topic</th>
<th>tutorial</th>
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<tbody>
<tr>
<td>1-Mar</td>
<td>1</td>
<td>1</td>
<td>Introduction to Brain and Behaviour (Johnston)</td>
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<td>2</td>
<td>Positive reinforcement and extinction (Livesey)</td>
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<td>3</td>
<td>The role of the discriminative stimulus in behaviour</td>
<td>no tutorial</td>
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<tr>
<td>7-Mar</td>
<td>2</td>
<td>4</td>
<td>The motivating role of the reinforcer in behaviour</td>
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<td>5</td>
<td>Fear and punishment (Livesey)</td>
<td>Introduction to the animal laboratory: DVD &quot;The Laboratory Rat&quot;</td>
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<td>6</td>
<td>Avoidance learning (Livesey)</td>
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<tr>
<td>15-Mar</td>
<td>3</td>
<td>7</td>
<td>Learned helplessness (Johnston)</td>
<td>1st practical: Habituation</td>
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<td>Choice and self-control (Johnston)</td>
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<td>9</td>
<td>Biological constraints on learning (Johnston)</td>
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<td>22-Mar</td>
<td>4</td>
<td>10</td>
<td>Studying intelligent behaviour in non-verbal animals</td>
<td>2nd practical: Establishing an instrumental response</td>
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<td>11</td>
<td>Application: Behavioural analysis of drug taking</td>
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<td>12</td>
<td>Application: Autism (Johnston + Guests)</td>
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<tr>
<td>29-Mar</td>
<td>5</td>
<td>13</td>
<td>Sociobiology: The selfish gene, survival and sex</td>
<td>3rd practical: Partial reinforcement</td>
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<td>14</td>
<td>Behavioural genetics (Johnston)</td>
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<td>15</td>
<td>Gene-environment interactions in behaviour (Johnston)</td>
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<td><strong>EASTER BREAK</strong></td>
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<tr>
<td>12-Apr</td>
<td>6</td>
<td>16</td>
<td>Concepts of brain function (Johnston)</td>
<td>4th practical: Extinction and conditioned reinforcement</td>
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<td>17</td>
<td>Neurons and glial cells (Johnston)</td>
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<td>18</td>
<td>Brain-body interactions and health (Johnston)</td>
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<td>19-Apr</td>
<td>7</td>
<td>19</td>
<td>Perceptual organization (Anderson)</td>
<td>5th practical: Report writing</td>
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<td>20</td>
<td>Perceptual organization II (Anderson)</td>
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<td>21</td>
<td>Perceptual organization III (Anderson)</td>
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<td>26-Apr</td>
<td>8</td>
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<td>ANZAC day public holiday</td>
<td>6th practical: Superstition</td>
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<td>22</td>
<td>The chemical senses I (Russell)</td>
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<td>23</td>
<td>The chemical senses II (Russell)</td>
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<td>3-May</td>
<td>9</td>
<td>24</td>
<td>Pain and touch (Johnston)</td>
<td>7th practical: The human brain (Learning lab reports due, Friday 7th May)</td>
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<td>25</td>
<td>Chronic pain (Johnston)</td>
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<td>26</td>
<td>Cortical reorganisation (Johnston)</td>
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<td>10-May</td>
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<td>27</td>
<td>Sound and hearing (Curthoys)</td>
<td>8th practical: Vision</td>
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<td>28</td>
<td>Pitch and hearing loss (Curthoys)</td>
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<td>29</td>
<td>Binaural hearing (Curthoys)</td>
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<td>17-May</td>
<td>11</td>
<td>30</td>
<td>Vestibular System 1. Balance and space flight (Curthoys)</td>
<td>9th practical: Audition</td>
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<td>31</td>
<td>Vestibular System 2: Inner ear controls visual stability</td>
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<td>32</td>
<td>Vestibular System 3. The neural basis of balance</td>
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<tr>
<td>24-May</td>
<td>12</td>
<td>33</td>
<td>Neurobiology of actions (Corbit)</td>
<td>10th practical: Psychopharmacology</td>
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<td>34</td>
<td>Habit learning (Corbit)</td>
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<td>35</td>
<td>Fundamental concepts in psychopharmacology (Corbit)</td>
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<tr>
<td>31-May</td>
<td>13</td>
<td>36</td>
<td>Drugs and the brain - Dopamine (Corbit)</td>
<td>Tutorial quiz and course evaluation held in your tutorial class Learning Lab reports</td>
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<td>37</td>
<td>Drugs and the brain - Other neurotransmitters (Corbit)</td>
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<td>38</td>
<td>Addiction and treatments (Corbit)</td>
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TEXTS

There is no required textbook for this course. However, it is highly recommended that students obtain copies of two books. References to these will be given in lectures and both books are recommended for 3rd year (Senior Psychology) courses that following on from PSYC2011.

Bouton, M.E. (2007). *Learning and Behavior: A Contemporary Synthesis* (This text will be particularly useful in Weeks 1-5 and is also used in the Senior Psychology course PSYC3011 *Learning and Behaviour*).

(This text will be particularly useful in Weeks 6-13 and is also used in the Senior Psychology course PSYC 3014 *Behavioural and Cognitive Neuroscience*).

FURTHER READING

Where possible references for lecture and tutorial material will be from the two texts above. In addition, some reference will be made to the following source in the later perception lectures:

**Plagiarism is not permitted**

i) Do you know what plagiarism is?

Please refer to the University policy on plagiarism:


ii) The School of Psychology will severely penalise **all** submitted work that is plagiarised;

iii) The School of Psychology is using software to detect **all** forms of plagiarism.

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**PLAGIARISM**

- More than 50% plagiarised
  - Unit Coordinator ensures that the student receives no marks for submitted work and requests a resubmission for a mark of zero

- Less than 50% plagiarised
  - Tutor/marker ignores plagiarised section(s) and marks remainder of submitted work, plus 10% penalty
THE UNIVERSITY OF SYDNEY LIBRARY

The University of Sydney Library is a distributed system of libraries with a collection of over 5 million items. Fisher Library has the most resources relevant to Psychology and is located on Eastern Avenue, Camperdown Campus.

http://sydney.edu.au/library

Faculty Liaison Librarian

Your Faculty Liaison Librarian supports the teaching, learning and research needs of staff, students and researchers for the School of Psychology. Contact details are as follows:


Psychology Guide

Includes links to Psychology databases, internet resources, information on tests and more.

http://libguides.library.usyd.edu.au/psychology

Psychology material in high demand

Reserve (located on Level 2 of Fisher Library) is a 2 hour loan collection of required and recommended items on Psychology reading lists. Reading list material can be searched by unit of study or lecturer via the catalogue:

http://opac.library.usyd.edu.au/search/r