

unit guide

Introduction to Biological and Cognitive Psychology

PSY_1_IBC

Faculty of Arts and Human Sciences Department of Psychology 2007/2008 Semester 2.

Web link. <u>http://www.lsbu.ac.uk/psycho/teaching/biocog-main.shtml</u> Course materials available on the Unit Blackboard site.

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Table of Contents

- 1.0 Unit Details
- 2.0 Short Description
- 3.0 Aims of the Unit
- 4.0 Learning Outcomes
 - 4.1 Knowledge and Understanding
 - 4.2 Intellectual Skills
 - 4.3 Practical Skills
 - 4.4 Transferable Skills
- 5.0 Assessment of the Unit and Feedback
- 6.0 Introduction to Studying the Unit
- 6.1 Overview of the Main Content
- 6.2 Overview of Types of Classes
- 6.3 Importance of self-managed learning time
- 6.4 Employability
- 7.0 The Programme of Learning and Teaching
- 8.0 Learning Resources
 - 8.1 Core Materials
 - 8.2 Optional Materials

1.0 Unit Details

Unit Title: Introduction to Biological and Cognitive Psychology

Level: 1

Reference Number: Psy_1_IBC

Credit Value: 1

Semester: 1

Subject Area: Psychology

Total Student Study Hours: 150

Contact Hours: 40

Student Managed Learning: 110 hours

Pre-requisites: None

Co-requisites: None

Excluded Combinations: None

Assessment Method: One piece of coursework

- Unit Co-Ordinator: Anne Ridley, Rm E332 ridleyam@lsbu.ac.uk
- Course Team Nicky Rycroft, E337 rycroftn@lsbu.ac.uk

Seminar tutors details will be provided in the lectures.

2. Short Description

This unit introduces students to selected topics in biological and cognitive psychology. The topics have been selected so that they can be presented at an appropriate level of difficulty for level one students, because we hope you find them interesting and so that they fit with a teaching programme that will continue at level 2. Topics include the relationship between brain and behaviour, how we perceive objects and faces, attention and memory for everyday events. Weekly lectures and fortnightly seminars are delivered by a team of three lecturers plus teaching assistants. Teaching will put an emphasis on the experimental basis of biological and cognitive psychology and seminars will involve various activities to check for understanding and support learning as well as and study skills exercise to help with the unit coursework. The assessment consists of a single piece of coursework, split into three mini-essays, whose aim is to examine your knowledge of selected topics and your ability to identify and present the key aspects of psychological explanations and the experiments on which they are based.

3. Aims

The unit aims to:

- Introduce students to topics in cognitive psychology, selected because of their (1) introductory value, (2) their appropriateness to a level one unit and (3) their interest value.
- Introduce students to topics in biological psychology, selected because of their (1) introductory importance, (2) their appropriateness to a level one unit and (3) their interest value.

4. Learning Outcomes

At the end of this unit, students will be able to:

- Identify and report the key issues in a given topic area
- Describe some of the main findings in a given topic area
- Describe the major explanations of these findings
- Describe key experiments that support these explanations
- · Identify and report criticisms of and counter evidence to these explanations
- Participate in key experiments, whilst demonstrating an understanding of their purpose and methodological reasoning
- Report the findings of these experiments and their interpretation
- Describe applications or specialist aspects of the topic area

4.1. Knowledge and Understanding and

4.2. Intellectual Skills.

This unit will provide students with the opportunity to:

- Understand the scientific nature of psychological reasoning
- Identify the key stages of psychological reasoning: identifying the phenomenon, the theories, the evidence for, the evidence against
- Make judgments and evaluations about theories based on a body of evidence

4.3 Practical skills

None

4.4. Transferable skills and Personal Development Planning.

Transferable skills relate to those that will be generally useful in the workplace and are therefore relevant to PDP. In relation to your PDP Skills Checklist, during the course of the unit you will be learning skills in relation to the following headings:

- Information searching finding appropriate electronic and printed sources of information
- **Communication** taking part in discussions, and writing essays. You should be able to communicate your knowledge clearly and concisely using written language and a prescribed format.
- Learning how to learn identifying learning strategies that suit you.

5. Assessment of the Unit

One piece of coursework consisting of three mini essays (500 words each).

These should all be handed in together and one overall mark will be given (which will be the average of the marks for the three mini-essays). At least two of the three mini-essays must be about a cognitive topic (Weeks 2-8) and at least one about a biological topic (Weeks 9-12).

The aims of the assessment are:

- 1. To examine your knowledge of selected content areas
- 2. To examine your ability to identify the key aspects of a particular area
- 3. To examine your ability to present information key information in a concise, structured way.

Please ensure that each mini-essay starts on a separate sheet and is stapled separately, but held together for submission with a paper clip or in a plastic folder (this is because different essays may be marked by different people). Also, please ensure that all sheets have your student number on them.

When submitting please write your seminar tutor's name as Marker.

Coursework submission deadlines are published on the Faculty of Arts and Human Sciences web site.

Feedback.

Feedback will normally be given to students 20 working days after the submission of an assignment.

6. Introduction to Studying the Unit.

Although having studied Psychology before (e.g. at A level) may be helpful, we do not assume any knowledge prior to coming to LSBU. The topics covered are quite diverse but do have an important common basis. They are all securely grounded in the scientific method. What this means is that knowledge is acquired through doing experiments. Experiments are carried out to explore a particular phenomenon, to test explanations of the phenomenon and to decide between competing explanations. There are strict rules for how experiments are done and interpreted. It is therefore essential that you begin to understand how experiments are executed, interpreted and used.

So, you need to learn not just about the content of a given topic area but also about the general method by which this knowledge has been acquired. This will form the basis for modules you take in year 2 and year 3.

It is essential that you attend both lectures and seminars.

6.1 Overview of the main content

Time	Lecture	Seminar	Staff
Week 1	Introduction to unit. What are cognitive	No seminar	AR
	and biological psychology?		
Week 2	Perception	Seminar	AR
Week 3	Perception	Seminar	AR
Week 4	Focused audio and visual attention	Seminar	AR
Week 5	Divided attention	Seminar	AR
Week 6	Short-term and working memory	Seminar	AR
Week 7	Aspects of long-term memory	Seminar	AR
Week 8	Cognition and emotion	Seminar	AR
Week 9	Overview of the nervous system	Seminar	NR
Week 10	Biological basis of learning and memory	Seminar	NR
Week 11	Lateralisation of function, arousal and	Seminar	NR
	emotion		
Week 12	Biological influences on cognitive	Seminar	NR
	performance		
Week 13	Self-managed study	No seminar	

The following is an indicative week-by-week programme.

6.2 Overview of Types of Classes

Teaching will be through lectures and seminars. Lectures will provide students with overviews of topic areas which involve descriptions of some of the main findings and explanations of basic concepts and theories. Seminar classes will allow students to check their knowledge and understanding of the day's lecture through a variety of exercises such as quizzes and summarizing a section of text in you're their own words.

Lectures: 1 lecture of approximately 1.25 hours per week. These take place on Thursday mornings starting at 9.30 a.m.

Seminars: 1 seminar per week. Details of seminar groups and times will be provided separately.

Unit information will be available via the Introduction to Biological and Cognitive Psychology Blackboard site.

6.3 Importance of Student Self-Managed Learning Time.

Biological and cognitive psychology are two of the more demanding topics in any psychology degree. It is therefore very important that you spend time throughout the semester reading the essential and recommended texts for each lecture to ensure that you have understood the topics taught to the best of your ability. In addition, you would find it useful to access journal articles so that you can read about the experiments discussed (or similar experiments) in full, to gain a greater understanding of the experimental methodology that underpins the subject.

6.4 Employability

A range of skills has been identified in 4.3 above. You will have the opportunity to develop these skills during the unit. They will help you not only to achieve your potential during your degree, but also with your career once you leave, whether you decide to become a professional psychologist

or not. Being able to identify these skills and how you got them will help you enormously when applying for jobs as a graduate.

7.0 The Programme of Teaching and Learning

Week-by-Week Breakdown of Teaching

Lecture 1. Introduction to the unit.

Aims

- 1. To introduce the unit.
- 2. To present important information about the unit.
- 3. To discuss what is meant by 'Cognitive Psychology'
- 4. To discuss what is meant by 'Biological Psychology'

Learning outcomes

By the end of the lectures students should

- 1. Understand how the unit will work
- 2. Understand what is meant by 'Cognitive Psychology'
- 3. Understand what is mean by 'Biological Psychology'.

Synopsis

This introductory will start with highlighting the various information in the Unit Guide, and explaining the structure of the course, assessment etc. As single honours students should have a grounding of what is meant by cognitive and biological psychology, the remainder of the lecture will essentially be discussion based drawing on the knowledge students gained during Level 1 units, in particular Foundations of Psychology. As Combined Honours students did not take Foundations of Psychology, some structure will be provided to ensure they are not disadvantaged.

Lectures 2 and 3 Cognitive Aspects of Perception

Aims

The aims of these two lectures are:

- 1. To provide an overview of perception
- 2. To introduce important aspects of the visual system
- 3. To describe general, historical theories of how we perceive form and depth e.g. Gestalt Theory
- 4. To explain what is meant by a percept: the constancies and anomalies of perception
- 5. To evaluate template, features and prototype theories of pattern recognition
- 6. To describe the geon theory of object recognition
- 7. To discuss top-down and bottom-up theories of perception and recognition

Learning outcomes

At the end of these lectures students should be able to:

- 1. Describe the visual system
- 2. Outline Gestalt theories of perception
- 3. Explain what is meant by constancies and describe anomalies in perception
- 4. Criticise template, feature list and recognition by component theories of pattern and object recognition.
- 5. Outline the putative relationship between bottom-up and top-down aspects of perception and recognition.

Synopsis

These two lectures provide an introduction to how we perceive the visual world. We start with an overview of the visual system before moving on to deal with the perception of form. Here we address the conundrums of how we separate objects we see from each other and from the background against which they appear and why objects have a constant perceived shape and size even though the retinal image changes dramatically with orientation and distance. We then move on to deal with how we perceive depth and the three dimensional nature of objects. In the second lecture we look in greater detail at the perception of form and investigate some of the major theories of how two and three dimensional patterns are analysed, constructed and recognised by the visual system. This is discussed in a framework of top-down and bottom-up processes of perception and recognition.

Reading

Essential:

Sternberg, R. J. (2006).Cognitive Psychology (4th Edition). Belmont CA: Wadsworth Thomson Learning. Chapter 4. Perception.

Recommended:

Davey, G., Albery, I., Chandler, C., Field, A., Jones, D., Messer, D., Moore, S. and Sterling, C. (2004) Complete Psychology. London: Hodder Chapter 12 "Perception"

Eysenck & Keane (2005). Cognitive Psychology. A Student's Handbook. 5 th Edition, Hove: Psychology Press. Chapters 2 and 3.

Lecture 4 - Focused auditory and visual attention.

Aims

The aims of the lecture are:

- 1. To introduce psychological study of the concept of attention.
- To explore theories of focused auditory attention.
 To evaluate theories of focused auditory attention in the light of empirical research.
- 4. To consider visual attention, specifically signal detection theory.

Learning outcomes

At then end of this lecture you should be able to:

- 1. Explain what is meant by 'attention' in psychology.
- 2. Describe theories of focused auditory attention and the associated experimental evidence.
- 3. Critically evaluate theories of focused auditory attention.
- 4. Explain what is meant by Signal Detection and its real world implications

Svnopsis

The concept of attention and the problems of definition will be described. We will then move on to theories of focused auditory attention, reviewing the experimental evidence both for and against each of the theories. This will be followed by evaluation of the theories in the light of this experimental evidence. Finally we will move on to visual attention and signal detection theory and its real world applications

Reading

Essential:

Sternberg, R. J. (2006).Cognitive Psychology (4th Edition). Belmont CA: Wadsworth Thomson Learning. Chapter 3

Recommended:

Braisby N. & Gellatly, A. (2005) Cognitive Psychology. Oxford: OUP. Chapter 2. Davey, G., Albery, I., Chandler, C., Field, A., Jones, D., Messer, D., Moore, S. and Sterling, C. (2004) Complete Psychology. London: Hodder. Chapter 13.

Eysenck & Keane (2005). <u>Cognitive Psychology. A Student's Handbook</u>. 5th Edition, Hove: Psychology Press. Chapter 5.

Lecture 5 - Divided attention.

Aims

The aims of the lecture are:

- 1. To introduce the concept of divided attention.
- 2. To outline the factors that determine performance in a dual-task.
- 3. To consider experimental studies of divided attention.
- 4. To outline theories explaining performance limitations in dual-tasks.
- 5. To evaluate these theories in the light of the experimental evidence.

Learning outcomes

By the end of this lecture you should be able to:

- 1. Define 'divided attention' and explain what is meant by a 'dual task'.
- 2. Describe the factors that affect performance in a dual task.
- 3. Summarise experimental studies related to divided attention and the factors that affect dual-task performance.
- 4. Review theories relevant to dual-task performance.
- 5. Critically evaluate these theories in the light of relevant empirical research.

Synopsis

We will consider what is meant by 'divided attention' and by 'dual-task' experiments and consider their applied relevance. We will then look at the various factors that affect performance in a dualtask: task similarity, task difficulty and practice. There are various theories that seek to explain performance limitations in dual tasks, and these will be considered and critically evaluated in the light of the experimental evidence.

Reading

Essential:

Sternberg, R. J. (2006). Cognitive Psychology (4th Edition). Belmont CA: Wadsworth Thomson Learning. Chapter 3

Recommended:

Davey, G., Albery, I., Chandler, C., Field, A., Jones, D., Messer, D., Moore, S. and Sterling, C. (2004) <u>Complete Psychology</u>. London: Hodder. Chapter 13

Eysenck & Keane (2005). <u>Cognitive Psychology. A Student's Handbook</u>. 5th Edition, Hove: Psychology Press. Chapter 4 pp 111-139 Chapter 5 pp 170-185.

Lecture 6 – Memory: Short-term and working memory.

Aims

The aims of the lecture are:

- 1. To provide an overview of the significance of memory and research into it
- 2. To describe the structure of memory (temporary and long-term stores) and
- 3. To consider Atkinson & Shiffrin's (1968) modal model of memory
- 4. To outline Baddeley & Hitch's (1974 working memory model)
- 5. To present and critically evaluate the concept of levels of processing.

Learning outcomes

At the end of this lecture you should be able to:

- 1. Appreciate how memory is crucial to human functioning.
- 2. Outline the modal model of memory
- 3. Describe the working memory model and review the evidence for it.
- 4. Explain the similarities and differences between short- and working-memory models.
- 5. Understand 'levels of processing' theory and its implications.

Synopsis

Following an introduction about the importance of memory to human functioning, the non-unitary view of memory will be described, with consideration of the modal model of memory. This will be followed by a more in-depth consideration of Baddeley & Hitch's working memory model. Levels of processing theory will be introduced along with evidence for and against the theory.

Reading

Essential

Sternberg, R. J. (2006).<u>Cognitive Psychology (4th Edition</u>). Belmont CA: Wadsworth Thomson Learning. Chapter 5.

Recommended

Baddeley, A. (1997). <u>Human Memory: Theory and Practice</u>, particularly Chapters 3, 4 and 13. Davey, G., Albery, I., Chandler, C., Field, A., Jones, D., Messer, D., Moore, S. and Sterling, C. (2004) <u>Complete Psychology</u>. London: Hodder. Chapter 14.

Eysenck & Keane (2005). Cognitive Psychology. A Student's Handbook. 5th Edition, Chapter 6 pp 187-210.

Braisby N. & Gellatly, A. (2005) <u>Cognitive Psychology</u>. Oxford: OUP. Chapters 3 and 4 Chapter 9. Chapter 8 270-273 & 284-286.

Lecture 7 – Memory: Aspects of long-term memory.

Aims

- 1. To define semantic, episodic and autobiographical memory.
- 2. To present models of semantic memory categorization and associated research.
- 3. To introduce schema and script theories and relevant research in relation to autobiographical memories.
- 4. To illustrate how schema and script theories help to explain memory failures.

Learning Outcomes

At the end of this lecture you should be able to

- 1. Define semantic, episodic and autobiographical memory.
- 2. Describe categorisation models for the storage of semantic information.
- 3. Evaluate the theories of schemas and scripts
- 4. Explain how schemas and scripts help to explain memory failures.

Synopsis

Firstly, semantic, episodic and autobiographical memory will be defined. The concept of semantic memory will be considered in the light of various theories of categorization such as the category search and feature comparison models. The main constructive theories of how autobiographical memories are stored (e.g. schemas and scripts) will then be presented and evaluated in the light of relevant research. This will include discussion of how such theories help to explain certain memory failures.

Reading

Essential

Sternberg, R. J. (2006).<u>Cognitive Psychology (4th Edition</u>). Belmont CA: Wadsworth Thomson Learning. Chapters 6 and 8

Recommended

Braisby, N. & Gellatly, A. (2005) <u>Cognitive Psychology</u>. Oxford: OUP. Chapters 5 and 14:3 Cohen, G. (1996). <u>Memory in the Real World</u>. Chapter 6.

Davey, G., Albery, I., Chandler, C., Field, A., Jones, D., Messer, D., Moore, S. and Sterling, C. (2004) <u>Complete Psychology</u>. London: Hodder Chapter 13.

Chapter 14.

Eysenck & Keane (2005). <u>Cognitive Psychology. A Student's Handbook</u>. 5th Edition, Hove: Psychology Press., Chapter 8 pp 263-272.

Lecture 8. Cognition and emotion.

Aims

The aims of the lecture are:

- 1. To define and outline the types and functions of emotions.
- 2. To look at research into mood-congruent and mood-dependent memory and memory bias.
- 3. To demonstrate experimental methods used to measure attentional biases and review the resulting evidence.
- 4. To discuss the importance of such research to the understanding of emotional disorders.

Learning outcomes

At the end of this lecture you should be able to:

- 1. Understand what is meant by emotion in the study of psychology.
- 2. Describe typical experimental methods used to measure the effects of emotion and mood on memory
- 3. Outline methods and outcomes of research into attentional bias
- 4. Understand how theory and research can be applied to the understanding and treatment of emotional disorders.

Synopsis

'Emotion' will be defined, and its functions discussed. We will then look at how emotion affects two types of cognitive function: attention and memory. The meaning of attentional biases will be explained, and typical experimental methods to measure them will be demonstrated (e.g. Stroop studies, dot-probe task). We will also look at how memory can be both mood-congruent and mood-dependent and look at the evidence for memory biases. The importance of research into cognition and emotion in promoting understanding of the development of anxiety disorders and depression will be explained, and the dissociation between the two different disorders and attention and memory will be described

Reading:

Essential:

Braisby N. & Gellatly, A. (2005) Cognitive Psychology. Oxford: OUP. Chapter 13.

Recommended:

The journal **'Cognition and Emotion'** is available on-line via LISA (the library) and has many articles relevant to today's lecture.

Lecture 9. Overview of the Nervous System

Aims

- 1. Introduce students to the structure of the nervous system
- 2. Describe some basic neuroanatomy
- 3. Describe how messages are carried around the nervous system
- 4. Describe methods used by biological psychologists exploring brain function and cognitive ability

Learning outcomes

At the end of this lecture students will:

- 1. Be able to describe the structure and function of different parts of the nervous system
- 2. Know what brain regions are involved in specific cognitive functions
- 3. Understand the basic principles of synaptic transmission
- 4. Know what methods are used by biological psychologists when exploring brain function and cognitive ability

Synopsis

This lecture will start by describing the structure of the human nervous system, focusing specifically on the central nervous system (the spinal cord and the brain). In particular, we will focus on the brain regions involved in some of the cognitive functions described earlier in this unit. The second part of the lecture will describe synaptic transmission, or how messages are carried around our nervous system. We will end by looking at some of the methods used by biological psychologists when exploring the relationship between brain activity and behaviour.

Reading

Essential

For the structure & function of the nervous system and methods used:

Kalat J.W. (2007) <u>Biological Psychology</u> (9th Edition). Belmont CA: WadsworthThomson Learning. Chapter 4 p81-116

For synaptic transmission:

Kalat J.W. (2007) <u>Biological Psychology</u> (9th Edition). Belmont CA: WadsworthThomson Learning . Chapter 2, Module 2.2 p39-48 and Chapter 3, modules 3.1 and 3.2 p51-68

Website

'Neuroscience for Kids' (just type this into Google and it will take you straight there) covers a lot of information given in this lecture. It is a very user friendly site that describes biological processes clearly and concisely.

http://faculty.washington.edu/chudler/neurok.html

Lecture 10. The Biological Basis of Learning and Memory

Aims

- 1. Describe the brain regions and structures involved in memory
- 2. Describe recent theories of how memories are 'stored' in our brains
- 3. Describe the changes that happen in our brain as a result of learning

Learning outcomes

By the end of the lecture students will:

- 1. Describe what happens in the brain when we try to retrieve a memory
- 2. Understand the different functions of the brain regions involved in memory
- 3. Be able to describe the mechanisms underlying long-term potentiation, or the changes in brain structure that occur as a result of learning

Synopsis

This lecture will start by reviewing the material on neuroanatomy from the previous lecture, with a specific focus on the brain structures involved in memory. We will also examine the structural changes that occur in the brain as a result of learning. Our brains are very plastic, meaning that physical changes occur in our brains as a result of material we learn and experiences we have. These changes are called long-term potentiation (LTP) and this lecture will describe the mechanism underlying LTP.

Reading

Essential

Kalat J.W. (2007) <u>Biological Psychology</u> (9th Edition). Belmont CA: WadsworthThomson Learning Chapter 13 p383-413

Lecture 11. Lateralisation of function, arousal and emotion

Aims

- 1. To describe how different functions are performed by the two sides of our brains
- 2. To describe the biological basis of emotion
- 3. To define the concept of arousal and link this to both cognitive function and emotion

Learning outcomes

By the end of the lecture students will:

- 1. Know what functions are performed by different sides of our brains
- 2. Understand what psychologists mean when they use the term 'arousal'
- 3. Understand the biological basis of emotion.

Synopsis

We have left and right hand side of our brains. While the physical structures (e.g. hippocampus, cerebellum, frontal lobe etc.) are found on both sides of the brain, the functions of the left and right hand side are sometimes different. This is known as lateralisation of brain function. This lecture will look at what functions are lateralised and the methods used to measure lateralisation. We will also explore how our brains process emotion. Arousal is a term commonly used in biological and cognitive psychology and we will define what is meant by arousal and how this links into the biological basis of emotion.

Reading

Essential

Kalat J.W. (2007) <u>Biological Psychology</u> (9th Edition). Belmont CA: WadsworthThomson Learning . Chapter 14, module 4.1, p415-428

And

Kalat J.W. (2007) <u>Biological Psychology</u> (9th Edition). Belmont CA: WadsworthThomson Learning . Chapter 12, module 12.1 p354-360

Lecture 12. Biological influences on cognitive performance

Aims

- 1. To describe the effects of brain damage on attention and perceptual processes
- 2. To describe how other biological factors, for example the role of different neurotransmitters and drug effects, can alter cognitive performance

3. To conclude as to what drug studies and brain damage can tell us about the biological basis of cognitive ability

Learning outcomes

By the end of the lecture students will be able to:

- 1. Describe the types of cognitive disorder that can result from brain damage
- 2. Understand the role of different neurotransmitter systems in cognitive performance
- 3. Evaluate how research on brain damage and drug effects can inform our understanding of the biological basis of cognitive performance.

Synopsis

This lecture will take a general look at how biological processes can influence cognitive performance. Firstly, we will look at case studies of brain damaged individuals and identify the effects damage to specific brain regions can have on cognitive ability. Secondly we will look at the role specific neurotransmitters can play in attention, learning and memory. This lecture will end by evaluating research on brain damage and drug effects to identify what such studies can tell us about the biological basis of attention, learning and memory.

Reading

Essential

Curran HV, Mintzer MZ (2006) Psychopharmacology of memory. Psychopharmacology 188:393-396. You can download this paper through the library (LISA) website.

Groome, D (1999) An Introduction to Cognitive Psychology: Processes and Disorders. London: Psychology Press. Chapter 3 p59-93

Optional Reading

Issue 188 of Psychopharmacology is a special issue on the role of different neurotransmitter systems in memory. The editorial by Curran and Mintzer, 2006 provides an overview of the papers in issue 188. Some articles may be of interest to you but please be aware that the papers contain more detail on pharmacology and drug effects that you are expected to know for this unit.

8.0 Learning Resources

8.1 Core materials

Sternberg, R. J. (2006). <u>Cognitive Psychology (4th Edition</u>). Belmont CA: Wadsworth Thomson Learning

Kalat J.W. (2007) Biological Psychology 9th Edition. Belmont CA: WadsworthThomson Learning

Please note that the library has many copies of the 8th Edition of Kalat. This edition covers all of the material required for this course but is not quite so up to date. The library also has other biological psychology textbooks (see references below for two examples.). These books contain very similar material to the recommended text. Please use the index of these books to find the topics we cover in this unit.

Pinel, J.P.J. (2006) Biopsychology(6th Edition). London: Pearson, Allyn and Bacon.

Rosenzweig, M.R., Breedlove, S.M. and Leiman, A.L. (2002) Biological Psychology: An Introduction to Behavioural, Cognitive and Clinical Neuroscience (3rd Edition). Sunderland, Mass: Sinaeur Associates.

8.2 Optional Materials

Davey, G., Albery, I., Chandler, C., Field, A., Jones, D., Messer, D., Moore, S. and Sterling, C. (2004) <u>Complete Psychology</u>. London: Hodder

Eysenck & Keane (2005). Cognitive Psychology. A Student's Handbook. 5th Edition, Hove: Psychology Press.