Abnormal

Remember the biological approach is considered reductionist. This is an important evaluation.

**Biological Level of analysis**

We will return to the general Learning Outcomes after we have filled in the gaps.

**Physiology and behavior**

* Explain one study related to localization of function in the brain (SAQ 2012)

Where applicable focus on aims, methods, findings. Identify the **specific part** of the brain AND its **function**.

**Case study: Phineas Gage by Dr John Harlow**. P42 Textbook

Also relates to ethical considerations in research. Phineas Gage had no confidentiality.

**Longitudinal Case study: HM by Milner (1957) originally but up until his death in 2008** p7 study guide

Can also be used for how and why particular research methods are used at the BLOA (case study). Can also be used as an example of cognition and physiology in BLOA. Can also be used for ethical considerations in research in BLOA. Also relates to Cognitive. Provides evidence for the MSM of memory i.e. that there are different stores for STM and LTM. It also shows that the LTM has different stores within it.

HM suffered epileptic seizures after a bicycle accident. Surgery was performed to stop the seizures. Tissue from the temporal lobe and **hippocampus** was removed.

Findings: HM’s personality was unchanged but he suffered from **amnesia**. HM could store new procedural memories (new actions/skills) but he was not able to store new semantic (knowledge/facts) or episodic memories (events/times). The **Hippocampus** plays a critical role in converting STM to LTM. The Hippocampus must be a **temporary store** because HM could retain memories of what happened before the surgery**.** Procedural memory must not be stored using the hippocampus. It is also evidence that memory is complex and many structures must be involved in it.

MRI scans by **Corkin et al** show that HM had severe brain damage to the hippocampus, which is critical in the storage of information into LTM.

Evaluations

+ Brain damage was unanticipated (seizures were cured)

+ Many tests were carried out and results contribute enormously to the knowledge of how memory processes are related to specific brain areas.

-Ethical concerns. HM was not able to remember all of his participation in research. Therefore full consent cannot be obtained. Justified by the importance of the findings.

- Cannot generalize findings to a larger population (lacks population validity).

* Using one or more examples, explain effects of neurotransmission on human behavior (SAQ Nov 2011)

**Serotonin Hypothesis Coppen 1967** See study guide p54

Only a brief description of how neurotransmitters work is required.

Supporting evidence: See p66 of study guide

+ Use of SSRI drugs **Elkin et al (1989).** Well controlled outcome study. Sample of 280 patients assigned to different treatment groups. Depressive symptoms were reduced in 50% of patients using SSRI’s compared to 29% on the placebo group.

**Henninger et al (1996)** reduced serotonin in healthy individuals but did not induce depressive symptoms. They argue that the serotonin hypothesis needs to be revised.

**Marazziti et al 1999 (from Human relationships attraction)**

A study in Pisa Italy. 20 participants had fallen in love within 6 months, 20 were untreated OCD, 20 normal. Serotonin levels in the blood of new lovers were equivalent to low levels found in OCD sufferers. This could explain the focus on the beloved.

* Using one or more examples, explain functions of two hormones in human behavior (SAQ May 2011 x 2)

**Oxytocin and attachment/trust (from Human relationships attraction) See p9 of the study guide**

This is secreted by the hypothalamus and released into the blood. In the brain oxytocin acts as a neurotransmitter. It is linked to increased trust. Released during childbirth AND during touching and sex. Betrayal disrupts bonds and may cause you to avoid the person who betrayed you. We need to learn who to trust.

**Baumgartner et al 2008 The role of oxytocin in trust in economic behavior**

Aim: To investigate the role of oxytocin after breaches of trust in a trust game

Method: “Investor” (player 1) receives a sum of money and decides whether to keep it or share with a “trustee” (player 2). If the sum is shared it is tripled. Then player 2 has a turn at the game. fMRI scans were carried out on 49 participants. They received oxytocin or placebo via a nasal spray. In 50% of the games their trust was broken, feedback on this was given by experimenters during the game.

Results: Participants in the placebo group were likely to show less trust after feedback on betrayal, they invested less. Participants in the oxytocin group continued to invest similar rates after of breaches of trust.

fMRI scan showed there were decreased responses in the amygdala, which has many oxytocin receptors.

+ Explains why people can forgive and restore trust in a long term relationship.

-Scanner research maps brain activity but nothing definite can be deduced from this at this point.

-This false way of receiving oxytocin may cause it to have different physiological effects.

**The Cortisol Hypothesis (Abnormal, biological etiology of depression)**

People with MDD often have high levels of the hormone cortisol. Cortisol is known as the stress hormone because it is produced in times of stress. This is not surprising as many depressive episodes are preceded by stressful events.

+ **Fernald and Gunnar 2008 Poverty and child depression p153 textbook**

639 Mexican Mothers and children. Children of depressed Mothers living in extreme poverty produced less cortisol (hormone that helps us cope with everyday life). This low level indicates that the stress system was “worn out”, leaving children vulnerable to depression and autoimmune diseases. **Also links to social factors in depression**

+ There is a link between long-term stress and MDD. This has been supported by findings of victims of child abuse.

+ There is a high prevalence of MDD among people with Cushing’s syndrome-a disease which results in excessive production of cortisol. When drug’s which normalize levels of cortisol are given, depressive symptoms disappear.

+/- High levels of cortisol may lower the density of serotonin receptors. This demonstrates how complex the brain’s chemistry is. This link is not fully understood and more research is needed.

- It may be a result rather than a cause of depression.

- People can develop depression without previously being stressed. People subjected to terrible stress do not always get depression.

**Can also use Cortisol and Memory p9 study guide-see below**

* Discuss two effects of the environment on physiological processes

Effect 1: Brain Plasticity Use p10 study guide and p46 of Textbook

**Rosenzweig and Bennett 1972**

What is another way of describing Brain plasticity?

What is meant by environmental stimulation?

What is the cortex and the frontal lobe?

What changes in the brain have been shown to occur in case studies of neglected children? Carried out by who?

Why is it not possible to carry out human deprivation experiments?

Rosenzweig and Bennett carried out their study on which animal species.

Aim, Method, Results

Evaluation:

Strengths

Weaknesses

For which learning outcome can this study also be used??

Effect 2: Cortisol and Memory Use p9 study guide

**Newcomer et al (1999) Help me remember when we have used Newcomer!**

**Also Lupien 1998 see p25 study guide. Links in with Cognitive-explain how biological factors may affect one cognitive process**

Effect 2: Stress and hippocampal damage in PTSD patients

Full details of background information and Bremner et al’s study

* Examine one interaction between cognition and physiology in terms of behavior (ERQ 2012)

Enough for a SAQ See p47 Textbook or p12 study guide

The focus is the interaction between cognition and physiology

Provide some background

Davidson et al (2004) Brain Waves and compassion meditation

* Discuss the use of brain imaging technologies in investigating the relationship between the biological factors and behavior (ERQ May 2011)

Use p13 of study guide and p45 of the textbook

Types of scanning

Why is scanning a useful way of investigating brain function

**EEG scan**

What does it stand for?

Strengths

Weaknesses

Supporting study: **Recycle Davidson et al (2004) Brain waves and compassion meditation OR Leuchter et al (2002) Changes in brain function during treatment with placebo**

**MRI scan**

What does it stand for?

Strengths

Weaknesses

Supporting study: **Recycle Bremner et al 2003 Stress and PTSD OR Corkin et al (1997) The case study of HM**

**fMRI scan**

What does it stand for?

Strengths

Weaknesses

Supporting study: **Recycle** Baumgartner et al 2008 The role of oxytocin in trust in economic behavior

**Overall evaluation of brain imaging technology**