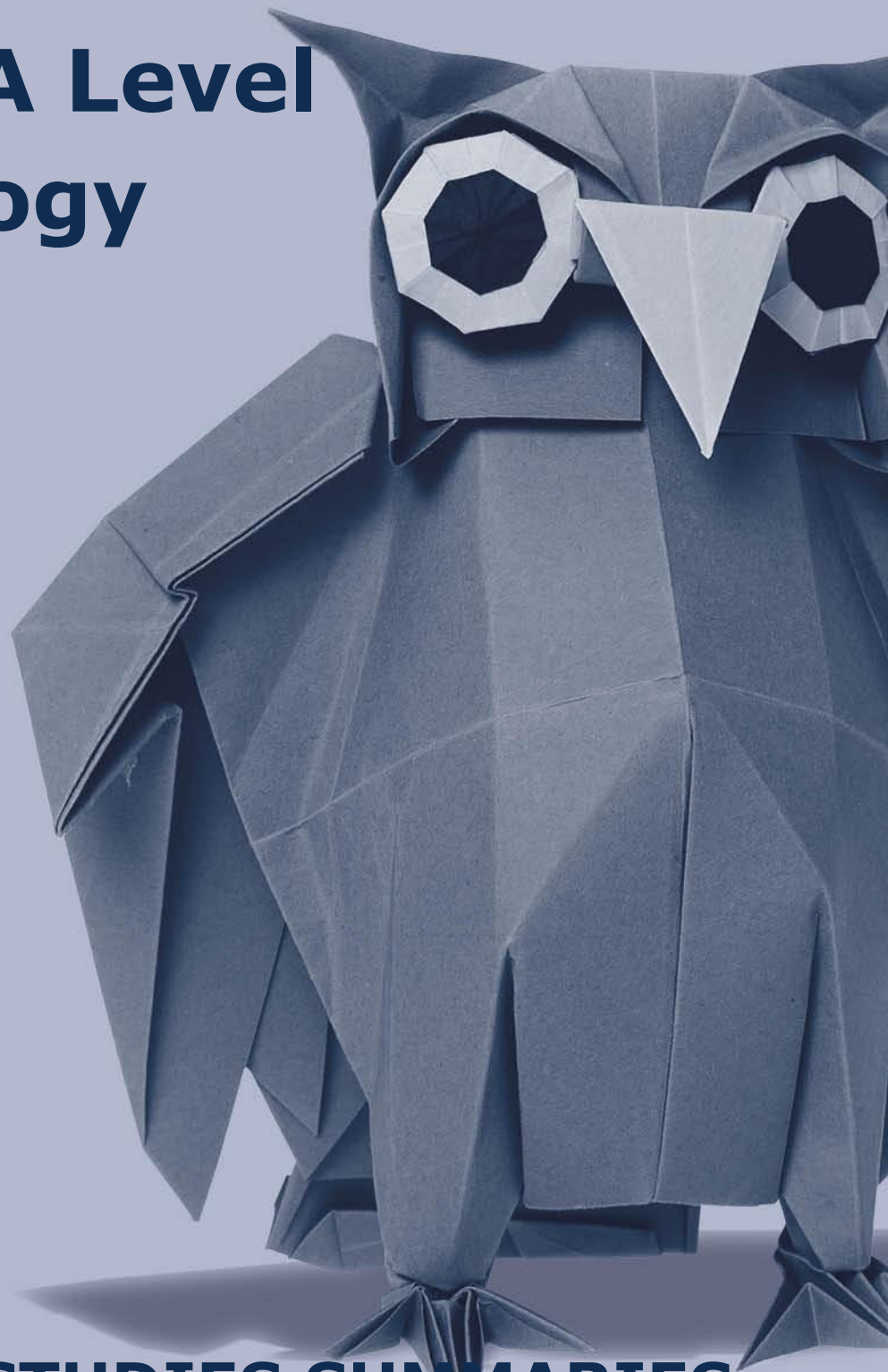


# AS and A Level Psychology



## SELECTED STUDIES SUMMARIES

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# GCE Psychology 2015

## Selected study summaries

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# Introduction

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## 1.1 About this booklet

This booklet has been produced to support teachers delivering the new 2015 AS and A level Psychology specification. The booklet includes selected studies from the specification which are not freely available to centres. Some of the studies included are compulsory and some are option studies (this is clearly highlighted where appropriate).

This selected studies summary booklet has been provided to enable centres to support their candidates with the published research studies that are named on the specification but may not be easily accessible to centres.

## 1.2 How to use this booklet

This booklet initially gives brief guidance on how classic and/or contemporary studies may be assessed in the 2015 GCE Psychology qualification. Subsequently there are summaries of selected studies which may be compulsory or optional content.

Each study contained within this booklet includes a summary of each study including the aim, procedure, findings, and conclusions.

To prepare candidates appropriately for assessment this booklet should be used in conjunction with the other resources available on the Pearson website. Candidates may be assessed on any of the assessment objectives (AO1, AO2, AO3) or a combination of these where appropriate.

## 1.3 Further support

A range of materials are available to download from the Psychology page of the Pearson website to support you in planning and delivering the new specifications. In addition, we will be holding training to support you with marking mocks in your centre and further information will be provided on our website when available.

Centres may find it beneficial to review this document in conjunction with:

- **GCE Psychology 2015 AS Level Sample Assessment Material**
- Assessment Objectives descriptors in **GCE A Level Psychology 2015 (8PS0) specification** (page 3)
- **Mathematical Skills** descriptors in Appendix 3 of the **GCE AS Level Psychology 2015 (8PS0) specification** (page 37-39)
- **Taxonomy (command words)** descriptors in Appendix 6 of the **GCE A Level Psychology 2015 (8PS0) specification** (page 49-50)

Our subject advisor team, led by Stephen Nugus and Julius Edwards, is also here to help. You can contact Stephen or Julius with any questions in the following ways:

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**Phone:** 020 7010 2190

**Twitter:** <https://twitter.com/@PearsonSciences>

**Subject page:** <http://qualifications.pearson.com/en/qualifications/edexcel-a-levels/psychology-2015.html>

## Brief guidance on assessment of studies

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### 2.1 Assessment Objective 1 (AO1)

Assessment objective 1 (AO1) involves demonstrating knowledge and understanding of the study. This could be regarding the aim(s), procedure, results, and/or conclusion(s) of the study.

AO1 could be assessed as a short answer question (less than 8 marks) or as part of an extended response question (8 marks or more).

Extended response questions use certain taxonomy (command words) to specify the assessment objectives required. For example, if students are asked to 'evaluate' a classic study for 8 marks this will be assessed using a Levels Based Mark Scheme and both AO1 and AO3 material will be required to be able to achieve 8 marks.

### 2.2 Assessment Objective 2 (AO2)

Assessment objective 2 (AO2) involves application of a classic or contemporary study. This could involve the use of the study to explain a novel stimulus, or to apply to Issues and Debates.

AO2 could be assessed as a short answer question (less than 8 marks) or as part of an extended response question (8 marks or more).

Extended response questions use certain taxonomy (command words) to specify the assessment objectives required. For example, if students are asked to 'discuss' a classic study in relation to a novel stimulus for 8 marks this will be assessed using a Levels Based Mark Scheme and both AO1 and AO2 material will be required to be able to achieve 8 marks.

### 2.3 Assessment Objective 3 (AO3)

Assessment objective 3 (AO3) involves analysing, interpreting, or evaluating the study to make judgements or to suggestion improvements.

AO3 could be assessed as a short answer question (less than 8 marks) or as part of an extended response question (8 marks or more).

Short answer questions (less than 8 marks) will typically use a combination of AO1/AO2 with AO3 as there is the identification or application of material before a judgement/conclusion is made or an improvement is reasoned.

Extended response questions use certain taxonomy (command words) to specify the assessment objectives required. For example, if students are asked to 'evaluate' a classic study in relation to a novel stimulus for 12 marks this will be assessed using a Levels Based Mark Scheme and AO1, AO2, and AO3 material will be required to be able to achieve 12 marks.

## Study 1: Baddeley et al. (1966b)

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### 3.1 Study summary

#### **Baddeley (1966b) Working memory model: The influence of acoustic and semantic similarity on long-term memory for word sequences.**

There are three experiments covered in this journal, where students only need to learn one for assessment.

Baddeley (1966a) assessed whether acoustically similar/dissimilar words and semantically similar/dissimilar words would be retrieved more accurately in the short term memory (STM). It was found that acoustically similar words showed greater forgetting than acoustically dissimilar, with forgetting for semantic words being unaffected.

Baddeley (1966b) attempted to assess whether the same trend would be shown in the long term memory (LTM). This was in contrast to previous research which tended to produce a finding for the LTM and then assess whether the STM was similarly affected.

There were four lists of 10 words:

- List A had 10 acoustically similar words
  - man, cab, can, cad, cap, mad, max, mat, cat, map
- List B had 10 acoustically dissimilar words
  - pit, few, cow, pen, sup, bar, day, hot, rig, bun
- List C had 10 semantically similar word
  - great, large, big, huge, broad, long, tall, fat, wide, high
- List D had 10 semantically dissimilar words
  - good, huge, hot, safe, thin, deep, strong, foul, old, late

All experiments involved four recall trials, followed by a final recall retest and the words were presented by tape recorder for experiments one and two (one per 3 seconds) but visually in experiment three. The order of the words was the thing being tested (as the words were visible throughout).

#### **Experiment one**

Participants had a listening test prior to the study and 3 were excluded at this stage. Participants were young servicemen with 18 in (List A), 17 in (List B), 20 in (List C), 20 in (List D). Participants were allowed 40 seconds to write down the sequence of words. After the four trials participants spend 20 minutes on an intervening task involving memory of eight digits (they were given sequence of digits and allowed 8 seconds to write them down in order). They were then retested without warning on the 10-word list.

It was found that acoustically similar words showed a lower performance on all learning trials and unlike the other lists, the acoustically similar list showed no forgetting on the retest. Semantically similar and dissimilar lists showed no significant differences. It was concluded that unlike STM, LTM was impaired by semantic similarity but not by acoustic similarity. Baddeley suggested this meant

the STM and LTM worked differently in how they coded information. Specifically, the STM relies largely on acoustic coding (and is relatively unaffected by semantic content of a message), but LTM uses semantic coding heavily (but not exclusively).

### **Experiment two**

Participants were prevented from rehearsal by including an interference task (between encoding and retrieval, or retrieval and encoding). It was predicted that the semantically similar list would show a lower learning score and no forgetting, similar to the acoustically similar list from experiment one. The acoustically similar list was predicted to show the same results as experiment one.

Only two lists were used for this experiment – the semantically similar (List C) and acoustically similar (List A). Participants had a listening test prior to the study and 6 were excluded at this stage. Participants were housewives from a participant panel with 20 in (X), 25 in (Y), and 23 in (Z) for List A and 17 in (X), 26 in (Y), and 20 in (Z) for List C. The conditions were:

- (X) – Learning and testing as in experiment one (baseline condition).
- (Y) – Learning and testing as in experiment one, except an interference task was interposed between encoding and retrieval (experimental condition).
- (Z) – Learning and testing as in experiment one, except an interference task was interposed between retrieval and encoding (control condition for practice effects).

The interference task used was the same 20 minute intervening task from experiment one involving memory of eight digits, except there were six eight-digit sequences for (Y) and (Z).

For the acoustically similar list, only condition (Z) showed significant forgetting between trial 4 and retest. Condition (Z) also performed significantly better on trial 1 than (X) and (Y).

As predicted, condition (Y) led to significantly lower learning score across all trials and retest and was significantly less than (X) and (Z). Condition (Y) also showed no significant forgetting between trial 4 and retest, as predicted. Condition (X) showed similar performance to experiment one, and was not significantly different to (Z) throughout.

It was concluded that the effect of STM could be eliminated or minimised which showed that experiment one was not just testing LTM as expected. This means the findings from experiment one do not necessarily answer the research question they wanted to about the influence of acoustic/semantic coding in LTM.

### **Experiment three**

Experiment three used visual presentation of the words on a slide projector which were visible for 3 seconds (with a changeover time of 2 seconds). As with experiment two, only two lists were used for this experiment – the semantically similar (List C) and acoustically similar (List A). Participants were mixed groups

of men and women from a participant panel with 15 in (A), 20 in (B), and 16 in (C) and 21 in (D). The conditions this time were:

(A) - Learning and testing for List (A) as in experiment one, except an interference task was interposed between encoding and retrieval (experimental condition).

(B) - Learning and testing for List (B) as in experiment one, except an interference task was interposed between encoding and retrieval (control condition).

(C) - Learning and testing for List (C) as in experiment one, except an interference task was interposed between encoding and retrieval (experimental condition).

(D) - Learning and testing for List (D) as in experiment one, except an interference task was interposed between encoding and retrieval (control condition).

The interference task was the same as in experiment two, where six eight-digit sequences were read out at a one second rate. Between trial 4 and retest the interference task was done for 15 minutes in experiment three.

There was no forgetting for either acoustically similar or dissimilar groups between trial 4 and retest. The similar list was more difficult on the trials 1-3, with a significant difference on trial 2, and this trend was reversed on trial 4 and retest. There was no forgetting for either semantically similar or dissimilar groups between trial 4 and retest. The similar list (C) showed slower learning and there was a significant difference in performance with List (D) on trial 4 and retest.

Experiment three indicated learning of words that are semantically similar leads to impaired performance. When combined with experiments one and two, this suggests that LTM may be based on the meaning or sound of words.

The findings from a previous study (Baddeley, 1966a) suggested STM is affected by acoustic coding, whereas the findings of this study suggest the LTM is affected by semantic coding, but not exclusively (as the STM was used for learning and no differences in learning in trials 1-3 in experiment three).

### **3.2 Links to further support materials**

Link to the original journal:

[http://www.tandfonline.com/doi/abs/10.1080/14640746608400047#.VqH-AVI2d\\_g](http://www.tandfonline.com/doi/abs/10.1080/14640746608400047#.VqH-AVI2d_g)

Component guides:

<http://qualifications.pearson.com/content/demo/en/qualifications/edexcel-a-levels/psychology-2015.coursematerials.html#filterQuery=category:Pearson-UK:Category%2FTeaching-and-learning-materials&filterQuery=category:Pearson-UK:Document-Type%2FGuidance>

Exemplar material:

<http://qualifications.pearson.com/en/qualifications/edexcel-a-levels/psychology-2015/teaching-support/understanding-the-standard.html>

Sample Assessment Materials (SAMs):

<http://qualifications.pearson.com/en/qualifications/edexcel-a-levels/psychology-2015.coursematerials.html#filterQuery=category:Pearson-UK:Category%2FSpecification-and-sample-assessments&filterQuery=category:Pearson-UK:Document-Type%2FSample-assessment-material>

Training (related to Psychology 2015):

<http://qualifications.pearson.com/en/support/training-from-pearson-uk.html?stp1=Pearson-UK:Qualification-Family%2FA-Level&stp2=Pearson-UK:Qualification-Subject%2FPsychology#step1>



## Study 2: Cohrs et al. (2012)

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### 4.1 Study summary

#### **Cohrs et al. (2012) Individual differences in ideological attitudes and prejudice: evidence from peer report data.**

The full journal article includes two studies which are linked so candidates can gain credit for either or both parts of the overall work conducted by Cohrs et al. (2012).

Previous research had suggested there was a link between different personality types and prejudice. Cohrs et al. (2012) raise concerns with the validity and reliability of the methods used so the premise of the study is to establish whether previous research can be supported with more comprehensive methodology. They argue that self-report data may not be accurate or consistent over time and as such this research used peer-report data to cross-check for validity and reliability.

The study aimed to see examine the interrelations among the Big Five personality dimensions, Right Wing Authoritarianism (RWA) and Social Dominance Orientation (SDO), and prejudice using both self-report and peer-report data. Cohrs et al. (2012) wanted to see whether the findings of previous research would be supported using two data collection methods, rather than just relying on self-report data.

Previous research had found:

- Ideological attitudes mediate personality influences on prejudice
- RWA and SDO contribute to ideological attitudes
- There is a link between personality traits (Openness to Experience and Agreeableness) and ideological views which lead to prejudice

More specific findings were:

- Openness to Experience correlated negatively with RWA, SDO, and prejudice
- Conscientiousness correlated positively with RWA
- RWA and SDO correlated positively with prejudice
- The negative relation between Agreeableness and prejudice was mediated by SDO
- The negative relation between Openness to Experience and prejudice was mediated by RWA
- Relations between Openness to Experience, Conscientiousness, and Agreeableness were mediated by SDO and RWA
- Extraversion correlated positively with prejudice (mediated by RWA)

Overall they were therefore looking for evidence of links between Openness to Experience, Agreeableness, but maybe also Conscientiousness in predicting prejudice (all mediated by RWA and SDO).

Opportunity sampling was used to recruit participants for study 1 which had one peer-rater whereas study 2 had two. For study 1 they were from the general

population in Germany and for study 2 from a twin registry (via volunteer sampling) and were all offered a personality profile and 12 Euros to participate. The participant profile is below.

<b>Study</b>	<b>Study 1</b>		<b>Study 2</b>	
<b>Rater</b>	Participant	Peer rater	Participant	Peer raters
<b>Number</b>	193	193	424	778
<b>Age</b>	18-67 (mean 34, SD 12)	13-73 (mean 34, SD 13)	18-82 (mean 34, SD 13)	14-85 (mean 34, SD 14)
<b>Genders</b>	125 women, 64 men (4 did not specify)	95 women, 97 men (1 did not specify)	321 women, 103 men	554 women, 224 men (17 did not specify and 53 only had one peer-rater)
<b>Strength of relationship</b>	Know participant very well (n=115), well (n=71), little (n=4), and 4 did not answer		Know participant very well (n=215), well (n=464), neither well nor little (n=90), and 26 did not answer	

To measure personality and prejudice the following apparatus was used:

- Big Five:
  - Study 1 used the NEO Five Factor Inventory (7-point scale) which had 12 items for each of the five factors (other than Openness which had 11 items)
  - Study 2 used the German version of the NEO Personality Inventory-Revised (5-point scale) which had 48 items for each of the five factors (other than Openness which had 45 items)
- RWA:
  - RWA D scale (11 items for study 1, 10 items for study 2)
- SDO:
  - SDO scale (slightly shortened version) (7-point scale for study 1, 5-point scale for study 2) with 13 items for study 1, 14 for study 2.
- Generalised prejudice:
  - Attitudes towards homosexuality (11 items for study 1, 7 items for study 2);
  - Attitudes towards foreigners (11 items for study 1, 7 items for study 2);
  - Attitudes towards people with disabilities (12 items for study 1, 14 items for study 2).

The findings of the study were very in-depth and so only a summary of the main findings is presented here.

The table below shows the key significant correlations for self-report data for study 1 and 2.

Variable 1	Variable 2	Correlation coefficient (all sig at p=0.001) for study 1	Did peer report agree?	Correlation coefficient (all sig at p=0.001) for study 2	Did peer report agree?
Openness to experience	RWA	<b>-0.43</b>	<b>Yes (-0.36)</b>	<b>-0.41</b>	<i>Yes (-0.22) but not significant correlation</i>
Openness to experience	Prejudice	<b>-0.43</b>	<b>Yes (-0.48)</b>	<b>-0.40</b>	<b>Yes (-0.26)</b>
Conscientiousness	RWA	<b>0.20</b>	<i>Yes (0.13) but not significant correlation</i>	<i>Not sig (0.20)</i>	<i>Yes (0.14) but not significant correlation</i>
Agreeableness	SDO	<b>-0.28</b>	<b>Yes (-0.36)</b>	<i>Not sig (-0.17)</i>	<b>Yes (-0.40)</b>
Agreeableness	Prejudice	<b>-0.20</b>	<b>Yes (-0.34)</b>	<i>Not sig (-0.07)</i>	<b>Yes (-0.36)</b>
SDO	Prejudice	<b>0.27</b>	<b>Yes (0.34)</b>	<b>0.37</b>	<b>Yes (0.28)</b>
RWA	Prejudice	<b>0.57</b>	<b>Yes (0.47)</b>	<b>0.50</b>	<b>Yes (0.48)</b>

Overall Cohrs et al. (2012) were therefore looking for evidence of links between Openness to Experience, Agreeableness, but maybe also Conscientiousness in predicting prejudice (all mediated by RWA and SDO). From the above data they state they found evidence for this which shows that:

- If an individual is less open to experience they are more likely to be RWA and prejudiced
- If an individual is more conscientious they are more likely to be RWA
- If an individual is less agreeable they are more likely to be SDO and prejudiced
- If an individual has SDO or RWA they are more likely to be prejudiced
- Previous research which relied only on self-report is supported using both self-report and peer-report data in their study. This shows that either (a) we can trust the findings of previous research or (b) that peer-report is subject to the same methodological limitations as self-report. There was some further analyses not reported here which suggested it is more likely to be (a) than (b) which is useful.

The major contribution of Cohrs et al. (2012) is to establish that self-report methods can be relied upon and within this that previous findings are trustworthy. In addition, Cohrs et al. (2012) did find a direct link between Openness to Experience and Agreeableness and prejudice as well as indirectly via RWA and SDO as expected.

## 4.2 Links to further support materials

Link to the original journal:

<http://psycnet.apa.org/journals/psp/103/2/343/>

Component guides:

<http://qualifications.pearson.com/content/demo/en/qualifications/edexcel-a-levels/psychology-2015.coursematerials.html#filterQuery=category:Pearson-UK:Category%2FTeaching-and-learning-materials&filterQuery=category:Pearson-UK:Document-Type%2FGuidance>

Exemplar material:

<http://qualifications.pearson.com/en/qualifications/edexcel-a-levels/psychology-2015/teaching-support/understanding-the-standard.html>

Sample Assessment Materials (SAMs):

<http://qualifications.pearson.com/en/qualifications/edexcel-a-levels/psychology-2015.coursematerials.html#filterQuery=category:Pearson-UK:Category%2FSpecification-and-sample-assessments&filterQuery=category:Pearson-UK:Document-Type%2FSample-assessment-material>

Training (related to Psychology 2015):

<http://qualifications.pearson.com/en/support/training-from-pearson-uk.html?stp1=Pearson-UK:Qualification-Family%2FA-Level&stp2=Pearson-UK:Qualification-Subject%2FPsychology#step1>

## Study 3: Raine et al. (1997)

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### 5.1 Study summary

#### **Raine et al. (1997) Brain abnormalities in murderers indicated by positron emission tomography.**

The aim of the study was to see whether there was different brain functioning in a group of murderers to control participants. The expectation was that the murderers would show evidence of brain differences in their prefrontal cortex as well as in other areas that are thought to be linked to violent behaviour. This expectation came from previous research which suggested that:

- Violent offenders had poorer brain functioning
- Damage to the prefrontal cortex was linked to aggression
- Abnormal function of the hemispheres in violent offenders
- Possible dysfunction to the corpus collosum in violent offenders
- The limbic structures (amygdala and hippocampus) are linked to aggression

The study examined the brains of 41 people (39 males and 2 females) who were charged with murder (or manslaughter) but pleaded Not Guilty by Reason of Insanity (NGRI) and compared them with 41 controls. The murderers had a mean age of 34.3, were not receiving medication at the time of the brain scan (and had been medication-free for two weeks prior), and urine scans supported this. The controls were the same sex, similar age (mean 31.7), did not take medication, and had no history of psychiatric illness (other than 6 schizophrenics who were compared with murderers diagnosed with schizophrenia).

All of the participants were injected with a glucose tracer, required to work at a continuous performance task (CPT) that was based around target recognition for 32 minutes, and then given a PET scan (ten minutes before injection they were given practice trials). The participants were compared on the level of activity in right and left hemispheres of the brain using two techniques called 'cortical peel' and 'box'.

The table below highlights the key findings.

<b>Key finding</b>	<b>Possible role of this brain region</b>
NGRIs had less activity in their prefrontal brain regions	The difference in activity in the prefrontal cortex can be linked to research which has found that damage to this region can result in aggressive acts through impulsive behaviour, loss of self-control, immaturity, altered emotional reactions, and the inability to change behaviour.
NGRIs had less activity in their parietal brain regions	The difference in activity in the parietal regions may be linked with deficits in learning deficits, such as low verbal ability, and could contribute to problems with processing social and cognitive information. This could ultimately predispose the individual to educational and difficulties in employment which could predispose someone to

	crime and violent behaviour.
NGRIs had more activity in their occipital areas	
<p>NGRIs had an imbalance of activity between the two hemispheres in amygdala, hippocampus, and thalamus</p> <ul style="list-style-type: none"> <li>• Less activity in the left side and more activity in the right side of the amygdala and the hippocampus</li> <li>• More activity in the right side of the thalamus, though no difference in the left side.</li> </ul>	The difference in activity in the amygdala can be seen to support theories of violence that suggest it is due to unusual emotional responses such as lack of fear.
NGRIs had less activity in the corpus callosum	The difference in corpus callosum activity can be matched up to evidence of people with a severed corpus callosum which show they can have inappropriate emotional expression and an inability to grasp long-term implications of a situation.

In addition to the above, there were no differences found in their temporal areas, no differences on the continuous performance task (CPT), and the differences in brain activity did not appear to be due to any differences in age, gender, schizophrenia, handedness, ethnicity, or history of head injury. From all of these findings Raine et al. (1997) argue that their research supports previous findings about the role of certain brain structures in violent behaviour.

It is clear from the findings that violent behaviour cannot be attributed to a single brain region and that multiple areas are involved. It is speculated that the differences in brain function do not directly cause violent behaviour but predispose those with dysfunction when combined with other social, psychological, and environmental predispositions to violent or aggressive behaviour.

## 5.2 Links to further support materials

Link to the original journal:

<http://www.sciencedirect.com/science/article/pii/S0006322396003629>

Component guides:

<http://qualifications.pearson.com/content/demo/en/qualifications/edexcel-a-levels/psychology-2015.coursematerials.html#filterQuery=category:Pearson-UK:Category%2FTeaching-and-learning-materials&filterQuery=category:Pearson-UK:Document-Type%2FGuidance>

Exemplar material:

<http://qualifications.pearson.com/en/qualifications/edexcel-a-levels/psychology-2015/teaching-support/understanding-the-standard.html>

Sample Assessment Materials (SAMs):

<http://qualifications.pearson.com/en/qualifications/edexcel-a-levels/psychology-2015/coursematerials.html#filterQuery=category:Pearson-UK:Category%2FSpecification-and-sample-assessments&filterQuery=category:Pearson-UK:Document-Type%2FSample-assessment-material>

Training (related to Psychology 2015):

<http://qualifications.pearson.com/en/support/training-from-pearson-uk.html?stp1=Pearson-UK:Qualification-Family%2FA-Level&stp2=Pearson-UK:Qualification-Subject%2FPsychology#step1>

## Study 4: Van Den Oever (2008)

### 6.1 Study summary

#### **Van den Oever et al. (2008) Prefrontal cortex AMPA receptor plasticity is crucial for cue-induced relapse for heroin-seeking.**

This study uses knowledge from both learning theories and biological psychology which are covered in Paper 2 at AS level or Paper 1 at A level. The biology is very complicated in this study so this summary is aimed at what is required for AS/A level students of Psychology.

The area relevant for learning theories is classical conditioning and evidence suggests that drug addicts make associations between environmental cues (such as people, places, things) and the drug(s) they abuse. The associations between drug paraphernalia (e.g. needles) and a drug (e.g. heroin) can sometimes lead an addict to want to relapse through exposure to the drug paraphernalia. Once the cues are absent for a certain period of time then extinction can occur, where the association between the stimulus (drug paraphernalia) and response (relapse of drug) is removed. However, re-exposure to the cues (or stimulus) may lead to the association forming again (which could lead to relapse).

The relevance of biological psychology is regarding how the brain responds to the drug(s) and also the environmental cues. Plasticity is when the brain physically changes in response to chemicals or through experiences - this has been shown to occur in response to long-term exposure to drugs and environmental cues associated with drugs. There is also the relevance of the brain's reward circuit (which was investigated by Olds and Milner, 1954 – see pg. 27) as the authors focus on the prefrontal cortex (which is involved in the reward circuit) and comes from previous research which suggested this area of the brain is involved in cue-induced relapse. A final area which will be covered in biological psychology is the role of the synaptic transmission in human behaviour, and there is a receptor named AMPA (and a subunit called GluR2) which Van den Oever et al. have previously found to have reduced synaptic membrane expression in the medial prefrontal cortex after re-exposure to heroin cues (after a period of abstinence). Furthermore, when blocking activity of the AMPA receptor in the ventral medial prefrontal cortex rats showed reduced cue-induced relapse to heroin (this may link to possible treatments).

An aim of Van den Oever et al. (2008) was to see whether brain plasticity happens in response to the drug but the main aim was to investigate the changes to the synaptic functioning of the brain after exposure to the cues associated with an abused drug. They believed that by investigating this process they may be able to help identify possible ways to treat drug addiction.

Male Wistar rats (280-300g in weight) were used across a number of different conditions (see table below). All were given food, water, were exposed to a 12hr light-dark cycle and the study was approved by The Animal Users Care Committee (based in the Netherlands).



Condition	Substance exposure	Abstinence	Relapse test
<b>Home cage</b>	Self-administered heroin for 15 days (3 hours daily) – some with cues present and control rats with no cues	21-day abstinence period in home cage	Re-exposed to heroin induced cues for 1 hour
<b>Extinction</b>	Self-administered heroin for 15 days (3 hours daily) with cues present	21-day abstinence which included 15 once-daily extinction sessions for 1 hour	Re-exposed to heroin induced cues for 1 hour
<b>Control</b>	Self-administered sucrose with cues present	No abstinence required	Re-exposed to heroin induced cues for 1 hour

In addition to the above, some rats were given an injection (**TAT-GluR2<sub>3Y</sub>**) in various areas of the prefrontal cortex to block activity of the AMPA receptor (and the subunit GluR2) to see if this had an impact on the cue-induced relapse. This was done prior to re-exposure to the cues. Previous research (see above) suggested that this receptor in the prefrontal cortex may minimise or suppress the impact of cue-induced relapse, which could then be used as a possible treatment for heroin addicts.

All of the brains of the rats were removed immediately after the relapse test and the medial prefrontal cortex was dissected.

From the brains that were removed Van den Oever et al. (2008) found that out of 417 proteins there were 6 proteins that changed significantly after cue exposure ( $p=0.01$ ) when compared with control rats. This suggested, along with other techniques used, that re-exposure to heroin cues resulted in reduced synaptic activity in the medial prefrontal cortex (specifically, the GluR2 subunit of the AMPA receptor was reduced by 10% and other receptors were also affected).

The group of rats given the injection were then assessed and compared to those not given an injection. The group that were injected in the ventral area (but not dorsal area) of the medial prefrontal cortex were similar to the control rats whereas the rats exposed to cues showed reduced synaptic activity in the GluR2 subunit of the AMPA receptor.

The results showed that plasticity does occur in the brain when re-exposed to cues associated with a drug of abuse. There appears to be a specific receptor (AMPA) and its subunit (GluR2) which contribute to the changes in synaptic activity when the cues are presented after a period of abstinence in a certain part of the brain (ventral medial prefrontal cortex). An interesting finding here is that it was the cue that changed the brain function and not the drug itself during the re-exposure.

Van den Oever et al. (2008) suggest that the findings regarding the injections could be used to develop possible treatments to help heroin addicts from seeking

to relapse when presented with cues such as the drug paraphernalia related to heroin.

## 6.2 Links to further support materials

Link to the original journal:

<http://www.nature.com/neuro/journal/v11/n9/full/nn.2165.html>

Component guides:

<http://qualifications.pearson.com/content/demo/en/qualifications/edexcel-a-levels/psychology-2015.coursematerials.html#filterQuery=category:Pearson-UK:Category%2FTeaching-and-learning-materials&filterQuery=category:Pearson-UK:Document-Type%2FGuidance>

Exemplar material:

<http://qualifications.pearson.com/en/qualifications/edexcel-a-levels/psychology-2015/teaching-support/understanding-the-standard.html>

Sample Assessment Materials (SAMs):

<http://qualifications.pearson.com/en/qualifications/edexcel-a-levels/psychology-2015.coursematerials.html#filterQuery=category:Pearson-UK:Category%2FSpecification-and-sample-assessments&filterQuery=category:Pearson-UK:Document-Type%2FSample-assessment-material>

Training (related to Psychology 2015):

<http://qualifications.pearson.com/en/support/training-from-pearson-uk.html?stp1=Pearson-UK:Qualification-Family%2FA-Level&stp2=Pearson-UK:Qualification-Subject%2FPsychology#step1>

## Study 5: Gottesman and Shields (1966)

### 7.1 Study summary

#### Gottesman and Shields (1966) Schizophrenia in Twins: 16 Years' Consecutive Admissions to a Psychiatric Clinic

Gottesman and Shields (1966) is included here as a possible twin study as part of the biological approach (see 3.2.3 in A-level specification).

Previous research by Rosenthal (of the Genain quadruplets) and other research into the genetic basis of schizophrenia had reported conflicting findings. Some had suggested that genes were a contributory factor (e.g. Inouye, 1961) whereas other reports suggested little impact of genes on schizophrenia (e.g. Tienari, 1963).

In light of this Gottesman and Shields (1966) aimed to examine the influence of inheritance of schizophrenia in twins over a 16-year period from a hospital in London.

The twins were selected from 392 patients who were seen at Maudsley and Bethlem Royal Joint Hospital between 1948 – 1964. From these twins, 47 had diagnosis of schizophrenia from the hospital and a further 21 received the same diagnosis since leaving the hospital. From the 68, three were excluded (due to being from Ghana, Jamaica, and Barbados) and then three more were removed due to uncertainty of mental state or zygosity of the co-twin. The final sample included 62 twins (of which both twins were included in 5) so a final total of 57 participants were assessed against their twin for inheritance of schizophrenia (see table below). The twins had a median age of 37 (19-54 years old), where 42/48 of the MZ twins had been seen by either author.

	<b>MZ</b>	<b>DZ</b>	<b>Total</b>
Female	11	16	<b>27</b>
Male	13	17	<b>30</b>
<b>Total</b>	<b>24</b>	<b>33</b>	<b>57</b>

The data collected to assess zygosity of the twins and then schizophrenia were:

- Hospital records
- Case histories
- Semi-structured interviews (30-minute, tape-recorded samples of verbal behaviour, attitudes towards their self, parents, and twin, and their ego strength)
- Minnesota Multiphasic Personality Inventory (MMPI)
- Goldstein-Sheerer Object Sorting Test

The results found suggested that identical twins (monozygotic or MZ) (where one had schizophrenia) were much more likely to both have schizophrenia compared to non-identical twins (dizygotic or DZ). The results are in the table below.

	MZ		DZ	
	Number	%	Number	%
Both twins have schizophrenia diagnosis	10	42	3	9
Both twins have psychiatric hospitalisation but co-twin has a different diagnosis	13	54	6	18
The co-twin has some form of psychiatric abnormality (but not hospitalised)	19	79	15	45

When considering the average likelihood of developing schizophrenia in the general population is just 1%, the findings suggest that if an individual has an identical (MZ) twin with schizophrenia they are 42 times more likely to have schizophrenia.

In addition to the above data the authors also examined the impact of the severity of schizophrenia in terms of time spent in hospital.

	MZ	DZ
% concordance for severe schizophrenia (more than 2 years in hospital)	77	15
% concordance for mild schizophrenia (less than 2 years in hospital)	27	10

This data shows that 77% of the MZ co-twins of severe schizophrenic individuals were also diagnosed with schizophrenia, compared to 15% of DZ co-twins.

A final area considered by the authors was the effects of schizophrenia on staying out of hospital and being employed.

	MZ	DZ
% concordance for severe schizophrenia (able to stay out of hospital and remain employed)	75	22
% concordance for mild schizophrenia (unable to stay out of hospital and remain employed)	17	0

This data shows that 75% of the MZ co-twins of severe schizophrenic individuals were able to stay out of hospital and remain employed, compared to 22% of DZ co-twins.

From the data it was concluded by Gottesman and Shields (1966) that genes contribute to schizophrenia. This is explained by the higher levels of concordance for MZ co-twins on all measures, compared to DZ co-twins and the baseline measure of the general population. However, the data suggest that since the MZ co-twin concordance is not 100% for schizophrenia there must be other factors

that contribute to the development of schizophrenia than inheritance. This combination of genes and environmental factors in causing a disorder is called the diathesis-stress theory of schizophrenia (see Rosenthal, 1963). This theory states that a combination of genes predisposes an individual to schizophrenia by lowering their threshold for coping with psychological stress.

## 7.2 Links to further support materials

Link to the original journal:

<http://bjp.rcpsych.org/content/112/489/809.short>

Component guides:

<http://qualifications.pearson.com/content/demo/en/qualifications/edexcel-a-levels/psychology-2015.coursematerials.html#filterQuery=category:Pearson-UK:Category%2FTeaching-and-learning-materials&filterQuery=category:Pearson-UK:Document-Type%2FGuidance>

Exemplar material:

<http://qualifications.pearson.com/en/qualifications/edexcel-a-levels/psychology-2015/teaching-support/understanding-the-standard.html>

Sample Assessment Materials (SAMs):

<http://qualifications.pearson.com/en/qualifications/edexcel-a-levels/psychology-2015.coursematerials.html#filterQuery=category:Pearson-UK:Category%2FSpecification-and-sample-assessments&filterQuery=category:Pearson-UK:Document-Type%2FSample-assessment-material>

Training (related to Psychology 2015):

<http://qualifications.pearson.com/en/support/training-from-pearson-uk.html?stp1=Pearson-UK:Qualification-Family%2FA-Level&stp2=Pearson-UK:Qualification-Subject%2FPsychology#step1>

## Study 6: Heston (1966)

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### 8.1 Study summary

#### **Heston (1966) Psychiatric Disorders in Foster Home Reared Children of Schizophrenic Mothers**

Heston (1966) is included here as a possible adoption study as part of the biological approach (see 3.2.3 in A-level specification).

There was previous research into the possible inheritance of schizophrenia which showed that relatives of schizophrenic individuals had a greater likelihood of being diagnosed with the disorder. During the 1950s and 1960s though one dominant theory was that which suggested nurture factors, such as that of a close relative, could be responsible for development of the disorder. The term 'schizophrenogenic mother' was in use at the time, which suggested that a parent could be the cause of the disorder by creating a distorted family environment. This apparently involved the parent producing a distorted interpersonal environment with the individual and the closer the relationship the greater the distortion. Heston's (1966) study was designed to test this assumption through an adoption study which separated nature from nurture.

The participants in the study were born between 1915 – 1945 to schizophrenic mothers in an American psychiatric hospital (where most were born in the hospital). Children were selected if their mothers had put them up for adoption and the researchers ensured the mother had (a) a diagnosis of schizophrenia; (b) evidence of behaviour consistent with schizophrenia; (c) no diseases; (d) that the child and mother were separated from birth. 74 children satisfied the conditions and it was checked that the child had no contact with the mother or her family from birth. The father's psychiatric status was not checked but none were known to be hospital patients.

Sixteen participants were dropped for reasons including death, contact with mother, disease, and no control participant due to exceptional circumstances, which left 58 participants. The remaining 58 participants were matched with like controls on sex, type of eventual placement, and length of time in child care. Due to further deaths and loss of contact through follow-up there were 47 experimental participants (30 male, 17 female) and 50 controls (33 male, 17 female).

To assess psychiatric status at follow-up the following were used where possible:

- Police records
- Retail credit reports
- School records
- Civil and criminal court actions
- Newspaper files were reviewed
- Any psychiatric hospital records
- Relatives, friends and employers were contacted
- Personal interview (25/97 either refused or were not available)
- Minnesota Multiphasic Personality Inventory (MMPI)
- IQ score (either from school/other records) or an IQ test was conducted

- Social class of the participant's first home
- Participant's current social class

Two psychiatrists evaluated the dossier compiled on each participant blindly and independently. A third evaluation was made by Heston himself. A diagnosis of schizophrenia was given only when all three raters agreed and they were also diagnosed by a psychiatric hospital. A score of 1-100 was assigned to each participant regarding this psycho-social disability (where 100 was highest) where scores below 75 indicate psychiatric symptoms become troublesome.

A summary of the findings is below:

Measure	Control	Experimental	Significant difference?
Number	50	47	No
Male	33	30	No
Age (ave)	36.3	35.8	No
Adopted	19	22	No
Psycho-social disability (ave)	80.1	65.2	Yes (p=0.0006)
Schizophrenia	0	5	Yes (p=0.024)
Spending more than 1 year in penal or psychiatric institution	2	11	Yes (p=0.006)
IQ (ave)	103.7	94	No
IQ below 70 (now would be diagnosed as mental retardation)	0	4	Yes (p=0.05)

The table shows that there were no differences in number of participants, gender, age, adoption rate, or IQ. Additionally, there were no differences in children, divorces, marriage rates, school years, social groups, or years serving in armed forces.

However, there were differences in psycho-social disability, schizophrenia, time spent in penal or psychiatric institutions, IQ deficiency, and in addition sociopathic personality, neurotic personality disorder, crimes, and number discharged from armed forces due to psychiatric or behavioural issues.

The rate of schizophrenia in those born to schizophrenic individuals was 10.6% compared with 0% in those not born to schizophrenic individuals. As a result, Heston (1966) concluded that the findings support the influence of genes in schizophrenia, and that inheritance also contributes to psycho-social disability. There must be other possible factors influencing the development of schizophrenia though because Heston also reports that half of the participants born to the schizophrenic mothers were successful adults who possessed artistic talents and imaginative adaptations to life which was not found in the control group.

## 8.2 Links to further support materials

Link to the original journal:

<http://bjp.rcpsych.org/content/112/489/819.short>

Component guides:

<http://qualifications.pearson.com/content/demo/en/qualifications/edexcel-a-levels/psychology-2015.coursematerials.html#filterQuery=category:Pearson-UK:Category%2FTeaching-and-learning-materials&filterQuery=category:Pearson-UK:Document-Type%2FGuidance>

Exemplar material:

<http://qualifications.pearson.com/en/qualifications/edexcel-a-levels/psychology-2015/teaching-support/understanding-the-standard.html>

Sample Assessment Materials (SAMs):

<http://qualifications.pearson.com/en/qualifications/edexcel-a-levels/psychology-2015.coursematerials.html#filterQuery=category:Pearson-UK:Category%2FSpecification-and-sample-assessments&filterQuery=category:Pearson-UK:Document-Type%2FSample-assessment-material>

Training (related to Psychology 2015):

<http://qualifications.pearson.com/en/support/training-from-pearson-uk.html?stp1=Pearson-UK:Qualification-Family%2FA-Level&stp2=Pearson-UK:Qualification-Subject%2FPsychology#step1>



## Study 7: Lavarenne et al. (2013)

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### 9.1 Study summary

#### **Lavarenne et al. (2013) Containing psychotic patients with fragile boundaries: a single group case study.**

The article by Lavarenne et al. (2013) describes a single session of out-patient group therapy for six individuals suffering with varying types of schizophrenia. The reason for the study is to give an insight into how the individuals in the group form firm boundaries which give them support during their illness.

A previous study reported that psychosis has been conceptualised to involve a weak Ego boundary, so the study attempts to investigate how the out-patients use the group session to provide firm boundaries. The suggestion is that the individual retreats into a fantasy world as they are unable to cope with reality. Firm boundaries are believed to moderate psychotic angst.

The group session usually had 10 members but only six attended the 45 minute session which was lead by the three researchers. The group had been running since 1985 and pre-doctoral psychology interns have trained as group therapists every year since 1997. Group members have attended for various time scales and the leaders' role is to bear the illness with the individual during the session to minimise isolation, and allow the individuals to choose their own level of intimacy and closeness during the session. These are a focus as it is suggested by the researchers that separation, isolation, and intimacy are associated with psychological crises.

Sessions are not tape-recorded or video-taped but instead coded (since 1998) where the therapists' record:

- Whether members express psychotic, manic, or depressed thoughts and behaviours
- The emotions observed (e.g. joy, anger, anxiety, sadness, guilt)
- Verbal expressions of loneliness, loss, dreams, current or past relationships, humour, illness, activity in their lives, helplessness, hopefulness, hopelessness, sexual preoccupation
- If members make supportive or insightful comments
- If members engaged or participated in the group

Previous assessment of the coded data (over a seven-year period) suggested that when enough time, support and acceptance is offered, participants in the group increase their maturation and functioning in a group setting.

The researchers point out that the six members of the group in the single session which the study refers to all had fragile Ego boundaries, which was expressed in different ways by the different members of the group. This is shown in the table below.

Group member	Recorded behaviour	What this reportedly shows/represents
Brett, Schizophrenic, Irish-Catholic, Caucasian	Gave out a Christmas card and calendar.	Wants the group to be linked together and connected to reinforce the group boundary, to help solidify his Ego boundary.
	Divides humanity into black, white, yellow (referring to skin colours) and speaks of threes	To give structure and boundaries to his fragmented inner world during psychotic decompensation.
	Told the group he received a gift of CDs from his sister and would keep it wrapped on the shelf to look at.	Possibly a way of holding himself together for a time over the Christmas holiday.
Earl, Schizophrenic, African American, Born in Texas and lived in Africa with his adoptive American parents before moving to Canada.	Rejected gifts from Brett.	Earl has an underlying fear of being annihilated and accepting the gift may have triggered fragmentation fears.
	Showed grandiose, delusional ideas about a large-scale multinational engineering project.	The delusion is holding the fragmented pieces of Earl's self together, so symbolises a boundary between Earl's self and the selves of others.
	Claimed to be 'a Falasha' (Ethiopian Jew) after being treated in a Jewish hospital.	He has a porous Ego boundary as he absorbed a false identity.
Deena	Reported having nightmares for which her psychiatrist suggested she be tested for sleep apnea. She refused and said she preferred her sleep issues to be treated in a 'psychological way' through thinking 'good thoughts' before bedtime.	Her focus between being awake and asleep is blurred and she therefore has a fragile Ego boundary.
Dan	The previous evening had 'an out-of-body experience and was very scared' he would not be able to get his 'spirit back into his body'.	He felt his Ego boundary to be very fragile during this frightening experience.
	Showed the group burns on his arms he had got from being distracted while cooking. He was currently trying to cope with a change in nature of his relationship with his girlfriend (a former fiancée).	He felt his Ego boundary to be extremely fragile and was asking for the boundaries of his relationship to be clearly defined.
Dillon	Agreed with a former member from a previous session about people staying in his house (an Aunt had moved in with the previous member), and that over Christmas he would	His ability to be aware of how much closeness he could tolerate shows insight. The limited tolerance to personal space and closeness indicates a fragile Ego boundary.

	struggle to cope with relatives staying. He suggested he would cope by going for a walk or shovelling snow.	
Andy, a sexually repressed and very competent mother of a daughter	Was offended by sexual references a former member had stated during a previous session. It is noted that she copes by swimming rigorously each day and limits her food intake, and she also helps several young relatives with homework each day after school.	The self-sacrificing and restrictive behaviours enables her to deal with her fragile Ego boundaries.

The conclusion made by the authors regarding the session is that each group member struggles daily with the environmental, social, and biological factors in their schizophrenia. They report that the sessions enable development of stronger Ego defences for each member through object relations, which enables a relationship between 'self' and 'others' to form. The authors saw their role as allies to the patients and that the group can serve as a buffer to prevent psychological crises which may lead to subsequent breakdown and rehospitalisation. In this way the group is serving as 'an auxiliary Ego-structuring mechanism' to offer the members a stabilising force and promote psychological growth.

## 9.2 Links to further support materials

Link to the original journal:

<http://www.ingentaconnect.com/content/afap/ajp/2013/00000067/00000003/art00005>

Component guides:

<http://qualifications.pearson.com/content/demo/en/qualifications/edexcel-a-levels/psychology-2015.coursematerials.html#filterQuery=category:Pearson-UK:Category%2FTeaching-and-learning-materials&filterQuery=category:Pearson-UK:Document-Type%2FGuidance>

Exemplar material:

<http://qualifications.pearson.com/en/qualifications/edexcel-a-levels/psychology-2015/teaching-support/understanding-the-standard.html>

Sample Assessment Materials (SAMs):

<http://qualifications.pearson.com/en/qualifications/edexcel-a-levels/psychology-2015.coursematerials.html#filterQuery=category:Pearson-UK:Category%2FSpecification-and-sample-assessments&filterQuery=category:Pearson-UK:Document-Type%2FSample-assessment-material>

Training (related to Psychology 2015):

<http://qualifications.pearson.com/en/support/training-from-pearson-uk.html?stp1=Pearson-UK:Qualification-Family%2FA-Level&stp2=Pearson-UK:Qualification-Subject%2FPsychology#step1>

## Study 8: Olds and Milner (1954)

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### 10.1 Study summary

#### **Olds and Milner (1954) Positive reinforcement produced by electrical stimulation of septal area and other regions of rat brain.**

Previous research studying the brain tended to investigate the responses that came after a stimulus (the authors call this the 'eliciting functions' of stimuli). The authors wanted to examine what they call the 'reinforcing functions' of stimuli by investigating what came before (or preceded) a stimulus to create a behaviour.

Olds and Milner wanted to stimulate different parts of the brain to see what behaviour rats showed in response. They would then examine the brain regions that produced reinforcement responses and see if they could find any areas directly linked to producing rewards.

They used 15 male rats, weighing approx. 250 grams and they were placed in a Skinner box which stimulated the brain electrically when a lever was pushed down. The idea was that any area being stimulated that produced more lever presses could be linked to positive reinforcement. The rat was given 6-12 hours of testing once the electrode was in place and was delivering stimulation and 1-2 hours of extinction, where no stimulation was given during lever presses. The researchers compared the response during testing and extinction to see if the stimulation had a positive, neutral, or negative reinforcing effect.

The rats had electrodes implanted in different regions of their brain through surgery and were given three days recovery before testing. During testing the researchers gave the rat one hour on day four after operation to get used to the box (and the experimenter placed the rat on the lever) but the response on this day was not recorded. On subsequent days the rats were given approx. 3 hours per day testing and 0.5 hours extinction for 2-3 days. Only the first 6 hours of testing per rat were compared. Rats were given food and water when required during testing and no other reinforcement was used.

The extinction period acted as a baseline and any rats that pressed the lever a lot more would be considered to be experiencing reward, less would be punishment and about the same would be a neutral effect. After testing the brains of the rats were removed and stained and then cut into sections.

See the table below for the results:

Rat number	Location of electrode in the brain	% time responding during stimulation	% time responding during extinction
32	Septal	75	18
34	Septal	92	6
M-1	Septal	85	21
M-4	Septal	88	13
40	Corpus callosum	6	3
41	Caudate	4	4
31	Cingulate cortex	37	9
82	Cingulate cortex	36	10
36	Hippocampus	11	14
3	Medial lemniscus	0	4
A-5	Mammillothalamic tract	71	9
6	medial geniculate	0	31
11	medial geniculate	0	21
17	tegmentum	2	1
9	tegmentum	77	81

The results showed that 7/15 areas provided rewarding effects (green shading), and the remainder neutral or punishment (6/15 were very similar, and 2/15 were much higher in extinction).

The highest reward area was the septal area (all 4 rats), then the mammillothalamic tract (1 rat), and finally the cingulate cortex (2 rats). The septal area is located in the central portion of the forebrain, beneath the corpus callosum, between the two lateral ventricles, and here rats spent 75-92% responding in testing vs. 6-18% in extinction. The cingulate cortex is located above the corpus callosum with 37% during testing vs. 9%; and the mammillothalamic tract had 71% vs. 9% during extinction. There was an anomaly where in the tegmentum one rat responded for 77% of the time during testing so was experiencing reward, but then responded 81% during extinction.

Olds and Milner used the data to speculate that there was a system of structures responsible for reward. This is primarily in the septal areas and to a lesser extent in the mammillothalamic tract and cingulated cortex. These are all located in the lower centre of the brain and are the first direct evidence of a reward area in the brain.

## 10.2 Links to further support materials

Link to the original journal:

<http://psycnet.apa.org/journals/com/47/6/419/>

Component guides:

<http://qualifications.pearson.com/content/demo/en/qualifications/edexcel-a-levels/psychology-2015.coursematerials.html#filterQuery=category:Pearson-UK:Category%2FTeaching-and-learning-materials&filterQuery=category:Pearson-UK:Document-Type%2FGuidance>

Exemplar material:

<http://qualifications.pearson.com/en/qualifications/edexcel-a-levels/psychology-2015/teaching-support/understanding-the-standard.html>

Sample Assessment Materials (SAMs):

<http://qualifications.pearson.com/en/qualifications/edexcel-a-levels/psychology-2015.coursematerials.html#filterQuery=category:Pearson-UK:Category%2FSpecification-and-sample-assessments&filterQuery=category:Pearson-UK:Document-Type%2FSample-assessment-material>

Training (related to Psychology 2015):

<http://qualifications.pearson.com/en/support/training-from-pearson-uk.html?stp1=Pearson-UK:Qualification-Family%2FA-Level&stp2=Pearson-UK:Qualification-Subject%2FPsychology#step1>