Psychology prep [35 marks]

**Paper 2 Section A Exam Style Questions [20]**

1. What was the aim of the study by Blakemore and Cooper [2]
2. Explain what is meant by a laboratory experiment. [2]
3. Explain why the study by Blakemore and Cooper is a laboratory experiment. [2]
4. Describe the procedure used in the study by Blakemore and Cooper. [3]
5. Describe two controls used in the study by Blakemore and Cooper. [2]
6. Outline one problem with the sample used in the study by Blakemore and Cooper. [2]
7. Outline 2 qualitative findings from the study by Blakemore and Cooper. [4]
8. Outline one reason why the study by Blakemore and Cooper can be considered unethical. [2]
9. Which of these statements of results is false? [1]
   1. All kittens showed behaviour blindness
   2. Kittens suffered from ‘physical blindness’
   3. There was no evidence of astigmatism
   4. There was no recovery of any deficiencies from their early deprivation

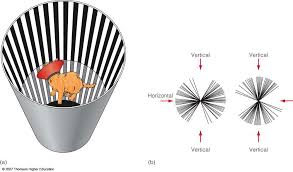
**Paper 2 Section B Exam Style Questions [15]**

1. Outline the biological area of psychology. [4]
2. Explain how the study by Blakemore and Cooper can be considered to be located within the area of biological psychology. [5]
3. Explain one weakness of the biological area of psychology. [3]
4. Explain one strength of the biological area of psychology. [3]

6. Which of these statements of results is false? D. There was no recovery of any deficiencies from their early deprivation

7. Outline one problem with the sample used in this study. A small sample of cats were used, therefore the effects of a limited visual experience on cats cannot be generalised to human behaviour or physiology.

8. Describe the procedure used in this study. Two weeks old kittens were randomly put in one of two environments. They stood on a glass platform in a tall cylinder which either had horizontal or vertical black-and white stripes. The visual field was restricted to 130 degrees and they wore a wide black collar; this prevented them from seeing their own body or anything beyond their world. This ended after 5 months and they were put in a well-lit room. Two months later, 2 of the kittens had their brains examined.

**Aims =** To investigate the physiological and behavioural effects of a limited visual experience and whether brain plasticity occurs due to experiences rather than nature.

**Sample =** Ps = new born kittens who were immediately placed into a dark room. At 2 weeks of age the kittens were then randomly placed into one of two conditions for 5 hours a day.

**Method**

This study was a laboratory experiment. IV = horizontal or vertical environment.

The kittens had to stand on a clear glass platform which was inside a tall cylinder of which the inner surface was covered with either horizontal or vertical black-and-white stripes. The kittens’ visual field was restricted to 130 degrees, as they were required to wear a wide black collar. This prevented them from seeing their own body and ‘beyond their world of stripes’.

After 5 months, the kittens were then placed for several hours a week from their dark cage to a small, well-lit furnished room. DV was then measured: whether kittens raised in a horizontal environment could detect vertically aligned objects and vice-versa. After 7 and a half months, two of the kittens, one from each environment were anaesthetised and their neurophysiology was examined.

**Results**

* All the kittens were extremely visually impaired
* they demonstrated no visual placing when put on a table top
* they had no startle response when an object was thrust towards them
* their papillary reflexes were normal and they guided themselves mainly by touch
* All kittens showed behaviour blindness - they could not detect objects or contours that were aligned in the opposite way to their previous environment.
* They showed fear when standing on the edge of a surface.

There was recovery from their early deprivation. After 10 hours the kittens showed visual placing and some startled responses; they could also easily jump from a chair to the floor. But the kittens did suffer some permanent damage such as trying to touch things well beyond their reach and following objects with clumsy head movements. The neurophysiological exam found evidence that horizontal plane recognition cells did not ‘fire-off’ in the kitten from the vertical environment and vice-versa.

**Conclusion**

Brain development is affected by early experiences and environmental factors rather than just genetics and there is clear evidence of brain plasticity – ‘the visual experience of these animals had modified their brain’ and therefore has serious perceptual consequences. The kittens’ visual cortex adjusts during development as a result of its visual experiences.

**Evaluation: Research method**

As this was a laboratory experiment, the kittens’ environments were highly controlled and therefore causal conclusions can be made. The study has levels of internal validity - we can infer that the IV (environment) caused visual impairment and neurophysiological damage (DV). The study could also be easily replicated in order to test the reliability of the findings (although this wasn’t done).

**Evaluation: Ethical considerations**

Exposing animals to a dark room for 2 weeks and in a visually depriving environment until 5 months is psychologically harmful for the kittens. However, B&C reported no distress from the animals. Furthermore, the study complied with the ethical guidelines for animal research. It could also be argued that any harm to the animals were outweighed by the usefulness of this research.

**Evaluation: Sampling bias**

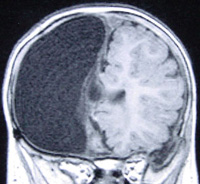
B&C would argue that due to some physiological similarities between cats and humans, we can generalise results to humans. But, critics would argue against this due to obvious differences between the species. Also, as the sample was small (2 cats) we may not be able to generalise to other cats.

How the data for the results were collected in the 20 Core Studies

|  |  |
| --- | --- |
|  | Electronic / scientific recording equipment - laptops recording accuracy and speed on the go / no-go tasks in the 1st experiment, fMRI scans in the 2nd experiment. |
|  | Electronic / scientific recording equipment – MRI scans analysed through Voxel based morphometry and pixel counting. |
|  | Electronic / scientific recording equipment (linguistic analysis tools – DAL and WMatrix) of the typed up spoken self-reports by the murderers. |
|  | Electronic / scientific recording equipment of the accuracy on the Eyes Task |
|  | Observation of the 2 DVs (time taken for the 1st passenger to help, total number of passengers who helped) |
|  | Observation of the helping rate of the 23 individual cities (calculated to give each city an Overall Helping Index) |
|  | Observation of the kittens’ visual reactions. Also electronic / scientific recording equipment to analyse the kitten’s neurophysiology. |
|  | Observation of the largest number of volts to which Ps would shock learner |
|  | Observation using time sampling to record what the child was doing every 5 seconds. |
|  | Observation, written and spoken self-reports, depending on the type of test (visual / tactile tasks) given to the split brain Ps. |
|  | Spoken self-report – answering questions such as: ‘Should he break in and steal some food? Why?’ |
|  | Spoken self-report in response to the questions: (1. Did you notice anything unusual? 2. Did you notice anything other than the six players? 3. Did you see a gorilla/umbrella woman walk across the screen?). |
|  | Written self-report – answers to the recall (short answer questions) and recognition (multiple choice questions) tests |
|  | Written self-report - estimated speed of the cars in the incident |
|  | Written self-report – in Yerkes’ Alpha and Beta tests. Also spoken self-report – individual examination of failed Army Alpha or Army Beta test. |
|  | Written self-report – whether P whistleblew by writing the statement |
|  | Written self-report (expt 1 – # of words recognised from the lists; expt 3 – # of digits recognised) and spoken self-report (expt 1 – asked to recall the rejected message; expt 2 – responses were tape recorded and analysed) |
|  | Written self-report from Little Hans’ father. |
|  | Written self-report on the 7 point scale for each of the 4 stories (social / physical). Also spoken self-report in discussions afterwards. |
|  | Written self-report –questionnaire completed by parents about the Funhaler. Also spoken self-report – one random check via telephone with interviewer. |

|  |  |
| --- | --- |
| Casey | Electronic / scientific recording equipment - laptops recording accuracy and speed on the go / no-go tasks in the 1st experiment, fMRI scans in the 2nd experiment. |
| Maguire | Electronic / scientific recording equipment – MRI scans analysed through Voxel based morphometry and pixel counting. |
| Hancock | Electronic / scientific recording equipment (linguistic analysis tools – DAL and WMatrix) of the typed up spoken self-reports by the murderers. |
| Baron-Cohen | Electronic / scientific recording equipment of the accuracy on the Eyes Task |
| Piliavin | Observation of the 2 DVs (time taken for the 1st passenger to help, total number of passengers who helped) |
| Levine | Observation of the helping rate of the 23 individual cities (calculated to give each city an Overall Helping Index) |
| Blakemore and Cooper | Observation of the kittens’ visual reactions. Also electronic / scientific recording equipment to analyse the kitten’s neurophysiology. |
| Milgram | Observation of the largest number of volts to which Ps would shock learner |
| Bandura | Observation using time sampling to record what the child was doing every 5 seconds. |
| Sperry | Observation, written and spoken self-reports, depending on the type of test (visual / tactile tasks) given to the split brain Ps. |
| Kohlberg | Spoken self-report – answering questions such as: ‘Should he break in and steal some food? Why?’ |
| Simons and Chabris | Spoken self-report in response to the questions: (1. Did you notice anything unusual in the video? 2. Did you notice anything other than the six players? 3. Did you see a gorilla/umbrella woman walk across the screen?). |
| Grant | Written self-report – answers to the recall (short answer questions) and recognition (multiple choice questions) tests |
| Loftus and Palmer | Written self-report - estimated speed of the cars in the incident |
| Gould | Written self-report – in Yerkes’ Alpha and Beta tests. Also spoken self-report – individual examination of failed Army Alpha or Army Beta test. |
| Bocchiaro | Written self-report – whether P whistleblew by writing the statement |
| Moray | Written self-report (expt 1 – # of words recognised from the lists; expt 3 – # of digits recognised) and spoken self-report (expt 1 – asked to recall the rejected message; expt 2 – responses were tape recorded and analysed) |
| Freud | Written self-report from Little Hans’ father. |
| Lee | Written self-report on the 7 point scale for each of the 4 stories (social / physical). Also spoken self-report in discussions afterwards. |
| Chaney | Written self-report –questionnaire completed by parents about the Funhaler. Also spoken self-report – one random check via telephone with interviewer. |

<https://www.youtube.com/watch?v=f2fCY_M7Vms>



|  |  |
| --- | --- |
| **Nature/nurture** | |
| **Nature**   * Behaviour caused by innate characteristics * Determinist - all behaviour is inherited   **Strengths**   * Objective methods used * Can show cause & effect   **Weaknesses**   * no control over own behaviour * Reductionist | **Nurture**   * Behaviour is **determined by the environment**   **Strengths**   * Allows for intervention programmes. * Wide range of research methods used   **Weaknesses**   * Reductionist * Harder to establish cause and effect |
| **Freewill/Determinism** | |
| **Determinism assumes that:**   * behaviour controlled by forces outside your control * Behaviour is predictable. * Behaviour is controllable.   **Strengths**   * Emphasis on cause and effect * Encourages interventions / therapies   **Weaknesses**   * Ignores free will over behaviour * Behaviour is too complex and variable * Doesn’t blame people for their behaviour | **Free will assumes that a person:**   * has control over their behaviour * is responsible for their own actions. * behaviour is not predictable.   **Strengths**   * Individual responsibility. * Emphasis on the individual. * Suggests behaviour is free   **Weaknesses**   * Unscientific - behaviour can’t be predicted or objectively measured * No clear definition of the term ‘free will’ |
| **Reductionism/Holism** | |
| **Reductionism**   * All psychological can be reduced to simple parts. * Claims behaviour is predictable as it is determined by one factor.   **Strengths**   * Allows detailed look at components that affect behaviour. * Explains certain types of behaviours * Scientific and open to testing.   **Weaknesses**   * Over simplifies complex behaviours. * Does not take into consideration other factors affecting behaviour. | **Holism**   * Looks at the whole picture/ individual * Useful when studying individuals   **Strengths**   * Looks at everything that may impact on behaviour. * Considers more than one cause.   **Weaknesses**   * Non- scientific. * Does not explain mental illness adequately. * Over complicates behaviours which may have a simple explanation |
| **Individual/Situational Explanation** | |
| **Situational =** Environment causes behaviour (e.g.; upbringing, poverty)  **Strengths**   * Suggests that behaviour is predictable so cause and effect can be found. * Behaviour can be changed by improving one’s environment.   **Weaknesses**   * Reductionist * Tends to rely on observations | **Individual =** Behaviour caused by a feature of the person (e.g. personality, genes)  **Strengths**   * Free will - gives people the responsibility to change themselves. * Holism: Takes into account individual differences   **Weaknesses**   * Difficulties generalising * Reductionist |
| **Usefulness of Research =** research is useful if it (D.R.U.G.V.)   * **develops** therapies, interventions, preventative action or treatments * provokes further **research** in the field * progresses **understanding** beyond previous findings * is **generalisable** to a wide population * is **valid** so that results are accurate | |
| **Ethical Considerations**  Consent**,** Debrief, Confidentiality, Deception, Right to withdraw, Protection from Harm | |
| **Conducting Socially Sensitive Research =** Socially sensitive research can S.C.A.R.  Subject to social norms Controversial Able to shape the law / policy Risking stereotyping and prejudice | |
| **Psychology as a science**  Falsifiable, Objective, Replicable, Quantitative data, Experiment | |
| **Methodological Issues**   * Research method (correlations, observations, self-reports, experiments). * Research length (snapshot, longitudinal). * Experimental design (repeated, independent, matched pairs). * Collection of data (quantitative / qualitative / what measures were used). * Sampling method (random, opportunity, self-selecting, snowball). * Sample size and features (nomothetic, idiographic, androcentric, ethnocentric). * Reliability (consistency, use of controls and standardised procedures, replicability). * Validity (internal – face / construct / content / concurrent; external – population / ecological / criterion / temporal). | |
| **Ethnocentrism**   * **Severe ethnocentrism**: belief that one’s own group (ethnic, social, cultural) is the most important * **Softer ethnocentrism**: people from 1 certain culture find it difficult to think outside their own cultural experience * **Sampling** may lack generalisability * **Research design / conclusions** may makes sense to their own cultural group, but may have little meaning to other cultural groups.   **Studying ethnocentrism h**elps to understand and prevent discrimination | |

### Evaluation: Research methods

**The experimental method used by Blakemore and Cooper was a lab experiment.**

**What are the features of a lab experiment?**

|  |
| --- |
|  |

**What was the independent variable?**

|  |
| --- |
|  |

**What was the dependant variable?**

|  |
| --- |
|  |

**What was controlled?**

|  |
| --- |
|  |

### Strengths and weaknesses

**What is the advantage of a lab experiment compared to other experimental methods?**

|  |
| --- |
|  |

**What is the main weakness of a lab experiment?**

|  |
| --- |
|  |

**Are these weaknesses apparent in Blakemore and Cooper’s study?**

|  |
| --- |
|  |

### Evaluation: Types of Data

**What is quantitative data?**

|  |
| --- |
|  |

**What are the advantages of quantitative data?**

|  |
| --- |
|  |

**What quantitative data did Blakemore and Cooper collect?**

|  |
| --- |
|  |

**How likely is this result to have occurred by chance?**

|  |
| --- |
|  |

**What are the disadvantages of quantitative data?**

|  |
| --- |
|  |

**What is qualitative data?**

|  |
| --- |
|  |

**What are the advantages of qualitative data?**

|  |
| --- |
|  |

**Give an example of qualitative data Blakemore and Cooper presented in their study.**

|  |
| --- |
|  |

**Blackmore and Cooper gathered both types of data. What were the advantages of this?**

|  |
| --- |
|  |

### Evaluation: Ethical considerations

You know the human ethical guidelines. We cannot apply these to animal studies. Clearly animals cannot give informed consent. So the guidelines are different. You do not need to know these specifically but you need to understand some of them to evaluate this study.

The key guidelines are: use as few animals as possible; inflict as little pain or distress as possible; only use animals when alternatives (e.g. tissue samples) could not be used; use a species as undeveloped and less likely to suffer as possible (e.g. don’t use a mouse where you could use a locust.)

So consider these questions….

**Did Blakemore and Cooper use as few animals as possible?**

|  |
| --- |
|  |

**Where there alternatives to using animals at all?**

|  |
| --- |
|  |

**Was the species as ‘low’ as possible and less likely to suffer?**

|  |
| --- |
|  |

### Strengths and weaknesses of animal experiments

**For animal experiments to be useful we have to be able to generalise the data/results and apply the data to humans.**

**In what ways are cat brains and eyes similar to human ones? How do they differ?**

|  |
| --- |
|  |

**So can we generalise the data from Blackmore and Cooper and apply to humans?**

|  |
| --- |
|  |

### Evaluation: Validity

**What is validity?**

|  |
| --- |
|  |

**Can we be sure that the IV truly (validly) affected the DV (kittens brains and behaviours), and so the conclusion is valid? To what extent were the kittens’ experiences similar to those which are experienced by humans?**

|  |
| --- |
|  |

**What can be concluded about the validity of Blakemore and Cooper’s study?**

|  |
| --- |
|  |

### Reliability

**What does a study need to be reliable?**

|  |
| --- |
|  |

**Was Blakemore and Cooper’s procedure replicable? Give an example of something they did which could be repeated.**

|  |
| --- |
|  |

**With the high levels of control is it likely that the study, if repeated, would have the same results? What can we conclude here about the reliability of the study?**

|  |
| --- |
|  |

### Evaluation: Sampling bias

**What was Blakemore and Coopers’ sample?**

|  |
| --- |
|  |

**Is there anything different to the sample here and the target population?**

|  |
| --- |
|  |

**As there were only two kittens that were used in the study, is it possible that there was something unusual about those kittens?**

|  |
| --- |
|  |

### Ethnocentrism

**Are the results of this study more applicable to one ethnic group than another? Why or why not?**

|  |
| --- |
|  |

**So is this study ethnocentric?**

|  |
| --- |
|  |

**Evaluation: Research methods**

**The experimental method used by Blakemore and Cooper was a lab experiment.**

**What are the features of a lab experiment?**

IV, DV, controlled environment.

**What was the independent variable?**

Direction of stripes- horizontal & vertical

**What was the dependant variable?**

The behaviour and orientation of neurons in the cats’ brain.

**What was controlled?**

The size and shape of the visual apparatus, what the kitten could see other than the visual apparatus, the time of exposure to the visual apparatus

**Strengths and weaknesses**

**What is the advantage of a lab experiment compared to other experimental methods?**

You can see cause and effect.

Contextualise this!

The only difference in the experience of the kittens was the direction of the lines they could see, so it must have been the cause of the differences in the kittens’ behaviour (e.g. response to vertical/horizontal rods) and orientation of neurones.

**What is the main weakness of a lab experiment?**

Lack of ecological validity

**Are these weaknesses apparent in Blakemore and Cooper’s study?**

Debatable, as such extreme deprivation doesn’t happen regularly. However, the extreme conditions clearly affected the cats’ brains and other visual deprivations would presumably also affect human brains. So perhaps low ecological validity is less an issue when studying the impact of the environment on our biology than it would be on other psychological areas.

**Types of Data**

**What is quantitative data?**

Data which measures quantities of something, usually in numbers

**What are the advantages of quantitative data?**

It allows information to be presented and compared easily, perhaps in the form of graphs. It also allows for inferential tests to be undertaken checking the likelihood that the results were obtained by chance.

**What quantitative data did Blakemore and Cooper collect?**

The number of neurons that responded to presentation in a particular orientation.

How was this presented graphically? Sketch the polar histograms and outline the differences between the three histograms.

In a normal cat the numbers of neurons which respond to a particular orientation are fairly evenly distributed throughout the 360 degrees. However, in vertically reared cats no neurons had a preferred orientation within twenty degrees of the horizontal (in vertical reared cats) or of the horizontal (in vertically reared cats.)

**How likely is this result to have occurred by chance?**

Less than once in one hundred thousand.

**What are the disadvantages of quantitative data?**

It tends to be superficial (as opposed to in depth) which reduces the amount of true understanding of the issue we can gather.

Contextualise this point.

The number of neurones which respond to a particular orientation does not tell us how **the** cat’s behaviour or understandings of the world were influenced.

**What is qualitative data?**

Data which attempts to measure the qualities of something, usually in the form of words.

**What are the advantages of qualitative data?**

It allows us to get in depth, rich information which should give us a full understanding of an issue.

**Give an example of qualitative data Blakemore and Cooper presented in their study.**

E.g. cats would not have a ‘startle’ response to a particular orientation of lines, that they seemed frightened when on the edge of a surface….

**Blackmore and Cooper gathered both types of data. What were the advantages of this?**

The qualitative data helps us to understand how the cat was really affected in its ability to experience the world whereas the quantitative data was objectively measured, not influenced by opinion or bias, and could be represented graphically with a statistical test performed on it.

**Ethical considerations**

**Did Blakemore and Cooper use as few animals as possible?**

Yes, at least in their measuring of the individual’s neurone responses which was an invasive procedure, only one kitten from each condition was used.

**Where there alternatives to using animals at all?**

Not if the study was to be done.

**Was the species as ‘low’ as possible and less likely to suffer?**

Kittens are less likely to suffer than primates, so that’s a good thing

A mammal really needed to be used in this study for it to be generalisable.

Would a mouse have done as well - possibly, but perhaps its brain is too different to humans to be sure to generalise from it.

**Strengths and weaknesses of animal experiments**

**For animal experiments to be useful we have to be able to generalise the data/results and apply the data to humans.**

**In what ways are cat brains and eyes similar to human ones? How do they differ?**

Eyes are binocular and see in colour. Both species see clearly.

Brains both have a visual cortex which is located in similar places.

Cat brains are smaller and less capable of organised thought.

**So can we generalise the data from Blackmore and Cooper and apply to humans?**

The physiological differences between the cat’s brain and a human brain plus the young age of the kittens would make the data difficult to generalise, despite the minor similarities. In addition, the lack of ecological validity prevents the data being generalised to everyday situations.

**Validity**

**What is validity?**

Validity refers to the accuracy of a test’s ability to measure what it is supposed to measure.

**Can we be sure that the IV truly (validly) affected the DV (kittens brains and behaviours), and so the conclusion is valid? To what extent were the kittens’ experiences similar to those which are experienced by humans?**

Probably because other extraneous variables e.g. the time of the exposure to the lines, or the kittens seeing their own bodies, were controlled so we can be confident that they didn’t influence the kittens’ development and the only thing which did was the lines they saw.

Therefore the conclusion is valid.

**What can be concluded about the validity of Blakemore and Cooper’s study?**

Not at all. But some visual impairments e.g. extreme astigmatism may reduce human ability to perceive the world and brain development in this case may be similarly affected. So perhaps the study has some ecological validity.

**Reliability**

**What does a study need to be reliable?**

It needs to be replicated to achieve the same results. This requires a standardised procedure which could be repeated and have the same effect on the next sample.

**Was Blakemore and Cooper’s procedure replicable? Give an example of something they did which could be repeated.**

E.g. keeping the kittens in the exact same size visual display apparatus.

**With the high levels of control is it likely that the study, if repeated, would have the same results? What can we conclude here about the reliability of the study?**

Yes. It was reliable and consistency of results suggests reliability.

**Sampling bias**

**What was Blakemore and Coopers’ sample?**

The sample in the study consisted of two kittens who were housed from birth in a completely dark room.

**Is there anything different to the sample here and the target population?**

We can’t say if the kittens were different to every day kittens, but they were bred for research so perhaps they came from a breed strain different to the average kitten?

**As there were only two kittens that were used in the study, is it possible that there was something unusual about those kittens?**

Yes. But it is unlikely.

**Ethnocentrism**

**Are the results of this study more applicable to one ethnic group than another? Why or why not?**

No - our brain biology is consistent across cultures and ethnicities.

**So is this study ethnocentric?**

No

| Core Study | Link to Area |
| --- | --- |
| Sperry (1968) Split brain study | Biological because it is showing, through split-brain patients, the way in which different abilities are localized within the two hemispheres of the brain and distinct areas control specific behaviours. Sperry’s study has a small sample in comparison to the Casey et al study. |
| Casey et al (2011)  Neural correlates of delay of gratification | Biological because it involves trying to see whether there is a neural basis to self-regulation. This is done through fMRI scans of people who, forty years previously, had taken part in Mischel’s delay-of-gratification (marshmallow) test. |
| Blakemore and Cooper (1970)  Impact of early visual experience | An early example of research into brain plasticity, in which evidence is put forward of the impact that the visual environment has on cats’ brains (specifically their visual neurons). Included as a biological study because of its focus on neurons, and also because it opens up the debate about whether biology affects behaviour or whether behaviour might even affect biology. |
| Maguire (2000) Taxi drivers | A modern counterpart to Blakemore and Cooper’s study which again illustrates brain plasticity. This time, though, it illustrates it amongst adult humans (specifically London taxi drivers) in a different part of the brain (the hippocampi). It also uses different techniques (MRI scans) to investigate it. The study also explains brain plasticity, in that the organisation of the brain is altered by experiences. |

Linking to the Area of Psychology

1. Outline how Sperry’s study links to the biological area of psychology. Support your answer with evidence from this study. [3] \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Outline how Casey’s study links to the biological area of psychology. Support your answer with evidence from this study. [3] \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Outline how Blakemore and Cooper’s study links to the biological area of psychology. Support your answer with evidence from this study. [3] \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Outline how Gottesman’s study links to the Medical Model of psychopathology. Support your answer with evidence from this study. [3] \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Outline how Hall and Player’s study links to the biological area of criminal psychology. Support your answer with evidence from this study. [3] \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. Outline how Van Leeuwen’s study links to the biological area of child psychology. Support your answer with evidence from this study. [3] \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Playing Scrabble Changes the Way You Use Your Brain**

Experienced Scrabble players know there’s more to the game than an expansive vocabulary. An effective player should also be able to quickly find words in a jumble of letters. Developing this skill will not only improve your game, it will change the way you use your brain.

In Scrabble, it’s not important to know the definition of a word, you just have to know that the word exists. Scrabble players take the time to memorize and prioritize such words as PHIZ (18 points), QUIFF (20 points), and MEZQUIT (27 points).

But it’s also important to practice the art of anagramming, the ability to form a word or phrase by rearranging a sequence of letters. For example, the letters in the word LISTEN may deliver more points when placed on the Scrabble board as SILENT. Over time, this practice can have a profound effect on our ability to solve visual word recognition tasks, or what’s referred to as a lexical decision task.

After becoming a Scrabble aficionado, Dr. Peter Sargious wondered if these abilities had a measureable effect on the brain. His team recruited 24 volunteers, 12 of whom were non-Scrabble players, and 12 of whom were Scrabble experts. Each was placed in front of a computer that displayed a jumble of letters. Their task was to identify, as quickly as possible, which letters could be re-arranged to form proper words. Their brain states were being monitored by an fMRI scanner.

Results showed that Scrabble players were better and faster at the task. But the researchers also learned that Scrabble players use a different parts of the brain.

*Results showed that when engaged in the lexical decision task (LDT), Scrabble experts made use of brain regions not generally associated with meaning retrieval in visual word recognition, but rather those associated with working memory and visual perception. The analysis of resting-state data also showed group differences, such that a different network of brain regions was associated with higher levels of Scrabble-related skill in experts than in controls [i.e. non-Scrabble players].*

Van Hees says that this finding points to the brain’s flexibility, and suggests that we can use different areas of the brain to do similar tasks. The researchers are hopeful that their research can be used to help people with neurodegenerative disorders, such as Alzheimer’s. By using brain training exercises—Scrabble included—alternative parts of a person’s brain could be developed.

1. Explain why this article can be viewed as being relevant to biological psychology. (4)
2. Briefly outline one core study and explain how it could relate to brain plasticity discussed in the source. (6)
3. Identify one psychological issue/problem or content raised by the above article. Support your answer with evidence from the article. (4)
4. Use your psychological knowledge to suggest a way to encourage all A Level students to use more of their brains. (6)
5. Evaluate your suggested method of managing the issue. (10)