6.10 Evaluating Biopsychology: Reductionism, Determinism and Methodology: 30-minute Pack

AQA 7182 · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions.

1 A researcher uses animal models to test effects of a neurotoxin on circadian rhythms and concludes the results directly apply to humans. State one evaluative point about the validity of generalising from animal biopsychology to humans.

(Total for Question 1 is 3 marks)

2 A published biopsychology study reports significant group differences with $p = 0.04$. Explain one implication of relying solely on p values when interpreting results of biopsychological research, particularly for complex traits.

(Total for Question 2 is 4 marks)

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3 Researchers argue that because brain processes involve neurons, hormones and genes interacting, simple biological explanations are incomplete. Identify and explain two methodological approaches that could help address biological reductionism in biopsychological research.

(Total for Question 3 is 4 marks)

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4 Discuss issues of reductionism, determinism and methodology in biopsychological research. In your answer, apply these issues to examples from biopsychology and consider implications for interpretation and application of findings.

(Total for Question 4 is 16 marks)

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Mark scheme · 6.10 Evaluating Biopsychology: Reductionism, Determinism and Methodology: 30-minute Pack

Question 1

states a limitation: physiological and behavioural differences between species may limit direct generalisation oe	**M1**
explains a consequence, e.g. mechanisms in rodents may not operate identically in humans, so translational validity is uncertain oe	**A1**
suggests that ethical, lifespan and environmental differences further reduce direct applicability oe	**A1**

Answer: Animal models may not fully represent human physiology and behaviour, so effects of a neurotoxin on rodent circadian rhythms may not translate directly to humans due to species differences and different living conditions.

Question 2

identifies limitation: p values indicate probability of the observed data under the null, not the size or practical importance of an effect oe	**M1**
explains that a significant p value with a small sample or small effect size may be misleading about practical relevance oe	**A1**
identifies need for effect sizes and confidence intervals, and replication, in biopsychology oe	**M1**
explains that for complex traits many small effects may exist and p values alone do not show reproducibility or biological importance oe	**A1**

Answer: P values do not convey effect size or reproducibility; a p = 0.04 may reflect a tiny or sample-specific effect. Biopsychology needs effect sizes, confidence intervals and replication to judge biological importance, especially for complex traits.

Question 3

identifies a methodological approach, e.g. multi-level, integrative research such as combining neuroimaging, behavioural measures and psychosocial assessment oe	**M1**
explains how combining levels addresses reductionism by capturing interactions between biological and psychological factors oe	**A1**
identifies a second approach, e.g. longitudinal or intervention studies to test causal pathways oe	**M1**
explains that longitudinal or experimental designs can help show direction of causation and contextual influences, reducing simplistic biological explanations oe	**A1**

Answer: Use multi-level integrative methods, combining neuroimaging, behavioural and psychosocial measures, and employ longitudinal or intervention designs. This captures interactions and helps test causal pathways, reducing simple biological reductionism.

Question 4

Level 4 Knowledge of reductionism, determinism and methodological issues in biopsychology is accurate and detailed. Discussion is thorough and balanced, using relevant, specific examples from biopsychology to support points. Evaluation considers implications for interpretation, causality and application, and alternatives or methodological improvements are discussed. The argument is coherent and uses appropriate terminology consistently.	**13-16**
Level 3 Knowledge is clear with some detail. Discussion evaluates issues and refers to examples from biopsychology, though some points may be less developed. There is a reasonable balance between description and evaluation, and some implications for interpretation and application are considered. The answer is mostly organised and uses specialist terms appropriately.	**9-12**
Level 2 Knowledge is present but limited or partial. Discussion contains some evaluative points but is largely descriptive or unbalanced. Examples are general or only partly linked to evaluation. Implications for interpretation and application are stated but not developed. Organisation and specialist terminology may be inconsistent.	**5-8**
Level 1 Knowledge is minimal and answers may be simplistic. Discussion is largely absent or superficial, with few or no relevant examples. Little consideration is given to implications for interpretation or application. Answer lacks structure and specialist terminology is missing or used incorrectly.	**1-4**
Level 0 No creditable content.	**0**

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Indicative content:

- AO1: Define biological reductionism: explaining complex behaviour solely in terms of neurons, neurotransmitters, hormones or genes, with examples such as explanations of aggression in terms of testosterone or of depression in terms of serotonin.
- AO1: Define biological determinism: the idea that biological mechanisms fix behaviour in a rigid way, with examples such as claims that localisation of function implies fixed, determinate brain loci for cognitive abilities.
- AO1: Methodological features of biopsychology include correlational designs, neuroimaging, lesion studies, animal models, small samples and ethical constraints preventing some experimental manipulations.
- AO3: Evaluate reductionism by noting its scientific strengths: testable biological mechanisms, precision and potential for pharmacological interventions. Give examples where reductionist accounts led to effective treatments, but also explain limitations: ignoring psychological and social influences reduces explanatory scope and may mislead interventions.
- AO3: Evaluate determinism by noting that some biological constraints exist, for example genetic predispositions and reflexive physiological responses, yet plasticity and individual variability limit deterministic claims. Use examples such as recovery of function after brain injury and handedness/lateralisation variability to challenge strict determinism.
- AO3: Methodological evaluation: brain-damage and lesion studies provide valuable causal evidence but are often opportunistic and limited by individual differences. Neuroimaging shows correlational activation patterns and can suffer from small samples, reverse inference and statistical issues. Animal studies offer control but limited generalisability. Longitudinal and intervention studies help with causality but have ethical and practical limits.
- AO3: Consider gender bias and sample bias: many classic biopsychology findings were obtained from male-only samples or specific clinical groups, so generalising to women or the general population can be unwarranted. Mention tend-and-befriend critique and examples.
- AO3: Discuss p values, effect sizes and replication: biopsychology must interpret statistical significance alongside effect sizes, confidence intervals and reproducibility. Small effects across many genes or neural circuits require cautious interpretation.
- AO3: Consider ethical and practical implications: deterministic biological claims can affect stigma and responsibility attributions; reductionist accounts can prioritise biomedical interventions and underplay psychosocial treatments. Discuss how multidisciplinary approaches and methodological triangulation can produce more nuanced explanations.
- AO3: Conclude with balanced judgement: biological explanations are essential and powerful but must be integrated with psychological and social levels; methodological improvements such as larger samples, multi-level designs and longitudinal studies can reduce overclaiming and improve applicability.

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