Mark Scheme (Results)

Summer 2024

Pearson Edexcel International Advanced Subsidiary Level in Psychology (WPS02) Paper 01 Biological Psychology, Learning Theories and Development

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Summer 2024
Question Paper Log Number P75832A
Publications Code WPS02_01_2406_MS

General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Section A

Question Number	Answer	Mark
1(a)	**AO1 (2 marks)** Credit **one** mark for each accurate statement of a conclusion. For example: McDermott (2008) • One conclusion was that those with low MAOA activity are more aggressive and more likely to administer hot sauce (1). • A conclusion was that the environment and genes interact when giving hot sauce to an opponent (1). Hoefelmann et al. (2006) • One conclusion was the perceived quality of sleep remained the same over the nine months of the study (1). • They concluded that physical activity was negatively correlated with the quality of sleep (1). **Look for other reasonable marking points.**	**(2)**

Question Number	Answer	Mark
1(b)	**AO1 (1 mark), AO3 (1 mark)** Credit **one** mark for accurate identification of an improvement (AO1) Credit **one** mark for justification/exemplification of the improvement (AO3) For example: McDermott (2008) • The sample could have included women as well as men to make the results about MAOA activity and aggression more generalisable (1), as the results about the effect of MAOA activity on the willingness to punish others would be more representative of both genders (1). Hoefelmann et al. (2006) • They could have used a range of students to include those who went to class during the daytime to increase generalisability (1), as the results on sleep quality would be more representative of all high school students (1). **Look for other reasonable marking points.**	**(2)**

Question Number	Answer	**Mark**
2(a)	**AO2 (2 marks)** Credit **two** marks for a fully operationalised non-directional hypothesis. Credit **one** mark for a partially operationalised non-directional hypothesis. For example: • There will be a relationship between the numbers of hours spent playing computer games in a day and the quality of sleep from 1, very poor quality, to 7, excellent quality (2). • There will be a relationship between the amount of time spent playing computer games and the quality of sleep (1). **Look for other reasonable marking points.** **Generic answers score 0 marks.**	**(2)**

Question Number	Answer	Mark
2(b)	**AO2 (4 marks)** Credit **one** mark for a correct calculation of total for d^2 = **61.5** Credit **one** mark for a correct calculation of 6 x61.5 times the sum of d^2 = **369** Credit **one** mark for a correct calculation of $369/6x(6^2-1)$ 6 times the sum of d^2 divided by $n(n^2-1)$ = **1.76** Credit **one** mark for a correct answer to two decimal places 1-1.76 = **-0.76**	**(4)**

Number of hours a day spent playing computer games	Rank 1	**Quality of sleep**	Rank 2	*d*	d^2
2	2.5	6	5.5	-3	**9**
3.5	4	5	4	0	**0**
6	6	3	2	4	**16**
4	5	2	1	4	**16**
2	2.5	4	3	-0.5	**0.25**
1	1	6	5.5	-4.5	**20.25**
				Total for d^2	**61.5**

Look for other reasonable marking points.

Question Number	Answer	Mark
2(c)	**AO2 (1 mark), AO3 (1 mark)** Credit **one** mark for accurate identification of one reason in relation to the scenario (AO2) Credit **one** mark for justification/exemplification of the reason (AO3) For example: • Herbert used ordinal data for his study on the relationship between the number of hours spent playing computer games and the quality of sleep (1), as he measured quality of sleep using a scale so two participants may have the same quality of sleep but give it a different score (1). **Look for other reasonable marking points.** **Generic answers score 0 marks.**	**(2)**

Question Number	Answer	Mark
2(d)	**AO2 (1 mark), AO3 (1 mark)** Credit **one** mark for accurate identification of a weakness in relation to the scenario (AO2). Credit **one** mark for justification/exemplification of the weakness (AO3). For example: • Herbert cannot determine a cause and effect between the number of hours spent playing a computer game and the quality of sleep (1), as it may be that those who have poor quality of sleep spend longer on computer games due to their quality of sleep or vice versa (1). **Look for other reasonable marking points.** **Generic answers score 0 marks.**	**(2)**

Question Number	Answer	Mark
3	**AO2 (4 marks)** Credit up to **four** marks for an accurate description in relation to the scenario. For example: • An infradian rhythm is a biological rhythm that lasts for more than a day, Kaiko's menstrual cycle lasts for 29 days (1). Women prefer masculine faces during their fertile period which is why Kaiko finds different types of men attractive at different times in her menstrual cycle (1). After the egg has been released progesterone and oestrogen increase and thicken the lining of the womb ready for fertilisation which may be why Kaiko is angrier a week before menstruation (1). If the egg is not fertilised the levels of oestrogen and progesterone drop and menstruation occurs, which can explain why Kaiko becomes calmer during menstruation (1). **Look for other reasonable marking points.** **Generic answers score 0 marks.**	**(4)**

Question Number	Answer	Mark
4 (a)	**AO1 (4 marks)** Credit up to **four** marks for an accurate description. For example: • Twin studies use monozygotic (MZ) and dizygotic (DZ) twins to help determine if aggression is due to nature or nurture (1). Psychologists would record the aggression of both pairs of twins in their study, for example through observations (1). The concordance rates for aggression between monozygotic (MZ) twins and dizygotic (DZ) twins is compared (1). If the concordance rate is higher for monozygotic (MZ) twins, then aggression is at least partly genetic (1). **Look for other reasonable marking points.**	**(4)**

Question Number	Answer	Mark
4 (b)	**AO1 (2 marks), AO3 (2 marks)** Credit **one** mark for accurate identification of a strength and a weakness (AO1) Credit **one** mark for justification/exemplification of the strength and the weakness (AO3) For example: Strength. • Confounding variables are more controlled, as the twins share the same environment before they are born and very similar environments after they are born (1), therefore it is a valid way to determine whether aggression is due to nature or nurture as it has higher internal validity than some other research methods (1). Weakness. • Twin studies often base the identification of a pair of twins as monozygotic (MZ) or dizygotic (DZ) on similarities in appearance rather than DNA, which can affect the results on aggression (1), so may influence the validity of any findings on aggression as some twins may have been incorrectly labelled as monozygotic (MZ) or dizygotic (DZ) (1). **Look for other reasonable marking points.**	**(4)**

Question Number	Indicative content	Mark
5	**AO1 (4 marks), AO3 (4 marks)** **AO1** • Exposure to excess testosterone whilst in the womb can affect the developing brain which may lead to an increase in aggression. • After birth testosterone sensitises some neural circuits, stimulating cell growth, including in the amygdala which can lead to aggression. • Low levels of cortisol can lead to an under aroused autonomic nervous system so people may be aggressive to increase arousal. • Adrenaline when released activates the flight or fight response, if the person chooses to fight this will lead to aggression. **AO3** • Chang et al. (2012) found that pre-experience levels of testosterone and cortisol positively correlated with displays to a mirror image, suggesting aggressive behaviours, therefore hormones can explain aggression in animals. • A lot of studies on the effect of hormones on aggression are done on animals, so they may not be a good explanation of aggression in humans as animals such as fish do not have the same social behaviour as humans. • The study of hormones and aggression is more scientific than other theories such as Freud's as it is more empirical, as levels of hormones and aggressive acts can be directly observed, making it a more credible explanation of aggression. • Dabbs and Morris (1990) found that socio-economic status was also a factor in aggression, with testosterone having less of an effect on aggression in those from higher social classes, so hormones are not a complete explanation of aggression. **Look for other reasonable marking points.**	**(8)**

Level	Mark	Descriptor
AO1 (4 marks), AO3 (4 marks) Candidates must demonstrate an equal emphasis between knowledge and understanding vs assessment/conclusion in their answer.		
	0	No rewardable material.
Level 1	1–2 Marks	Demonstrates isolated elements of knowledge and understanding. (AO1) Generic assertions may be presented. Limited attempt to address the question. (AO3)
Level 2	3–4 Marks	Demonstrates mostly accurate knowledge and understanding. (AO1) Candidates will produce statements with some development in the form of mostly accurate and relevant factual material, leading to a generic or superficial assessment being presented. (AO3)
Level 3	5–6 Marks	Demonstrates accurate knowledge and understanding. (AO1) Arguments developed using mostly coherent chains of reasoning leading to an assessment being presented which considers a range of factors. Candidates will demonstrate understanding of competing arguments/factors but unlikely to grasp their significance. The assessment leads to a judgement but this may be imbalanced. (AO3)
Level 4	7–8 Marks	Demonstrates accurate and thorough knowledge and understanding. (AO1) Displays a well-developed and logical assessment, containing logical chains of reasoning throughout. Demonstrates an awareness of the significance of competing arguments/factors leading to a balanced judgement being presented. (AO3)

Section B

Question Number	Answer	Mark
6 (a)	**AO1 (1 mark), AO2 (1 mark)** Credit **one** mark for an accurate definition (AO1). Credit **one** mark for a suitable example (AO2). For example: • Positive reinforcement is receiving something that is desired after demonstrating a behaviour (1). For example, being given a sweet that you want after tidying your bedroom (1). **Look for other reasonable marking points.**	**(2)**

Question Number	Answer	Mark
6 (b)	**AO1 (1 mark), AO2 (1 mark)** Credit **one** mark for an accurate definition (AO1). Credit **one** mark for a suitable example (AO2). For example: • Negative reinforcement is removing or avoiding something unpleasant after demonstrating a behaviour (1). For example, avoiding an undesired poor grade by revising (1). **Look for other reasonable marking points.**	**(2)**

Question Number	Answer	Mark
6 (c)	**AO1 (1 mark), AO3 (1 mark)** Credit **one** mark for accurate identification of a strength (AO1). Credit **one** mark for justification/exemplification of the strength (AO3). For example: • Operant conditioning is a more complete explanation than classical conditioning, so it is more credible (1), as it describes how new voluntary behaviours are learned rather than just focussing on reflexive behaviours (1). **Look for other reasonable marking points.**	**(2)**

Question Number	Answer	Mark
7 (a)	**AO2 (2 marks)** Credit up to **two** marks for an accurate description in relation to the scenario. For example: • Sophia would have got a list of all the different ethnic backgrounds of the children at the local school and what percentage of the children were from each ethnic background (1). She would then try to ensure that she had the same percentages of children from each ethnic background in her sample (1). **Look for other reasonable marking points.** **Generic answers score 0 marks.**	**(2)**

Question Number	Answer	Mark
7 (b)	**AO2 (2 marks), AO3 (2 marks)** Credit **one** mark for an accurate identification of a strength and a weakness in relation to the scenario (AO2). Credit **one** mark for justification/exemplification of the strength and the weakness (AO3). For example: Strength. • As Sophia's sample has the same percentages of children from each ethnic background as the target population her sample is representative of the school children (1), which means that the results on children's play at different stages of development are true of all the children at the school so they are generalisable (1). Weakness. • Sophia may have children who have parents from two different ethnic backgrounds in her sample which could affect her groupings (1), as she would have to decide whether the child went in the mother or the father's ethnic group which would be a subjective decision (1). **Look for other reasonable answers.** **Generic answers score 0 marks.**	**(4)**

Question Number	Answer	Mark
7 (c)	**AO2 (1 mark), AO3 (1 mark)** Credit **one** mark for accurate identification of a reason in relation to the scenario (AO2). Credit **one** mark for an accurate justification/exemplification of the reason (AO3). For example: • Sophia may have used a structured observation as she can control all the variables whilst the children are playing, such as no distractions from other children (1), so she can be more certain that any differences in play are due to the development stage of the children and not other confounding variables (1). **Look for other reasonable marking points.** **Generic answers score 0 marks.**	**(2)**

Question Number	Answer	Mark
7 (d)	**AO2 (1 mark), AO3 (1 mark)** Credit **one** mark for accurate identification of an improvement in relation to the scenario (AO2). Credit **one** mark for justification/exemplification of the improvement (AO3). For example: • Sophia could have had another observer with her to also record whether the children played next to each other or with each other (1), they could then compare results and check they were consistent, so increasing reliability if both observers agreed on how the children were playing (1). **Look for other reasonable answers.** **Generic answers score 0 marks.**	**(2)**

Question Number	Answer	Mark
8 (a)	**AO1 (1 mark)** Credit **one** mark for an accurate statement. For example: • Capafóns et al. (1998) aimed to confirm that systematic desensitisation was an effective treatment for phobias (1). **Look for other reasonable marking points.**	**(1)**

Question Number	Answer	Mark
8 (b)	**AO1 (3 marks)** Credit up to **three** marks for an accurate description. For example: • There was a total of 41 participants in the study, all of whom were afraid of flying (1). 20 of the participants were in the treatment group and had systematic desensitisation for their fear of flying (1). The participants in the treatment group and the control group were matched in terms of how scared they said they were of flying (1). **Look for other reasonable marking points.**	**(3)**

Question Number	Answer	Mark
8 (c)	**AO1 (2 marks), AO3 (2 marks)** Credit **one** mark for accurate identification of each weakness (AO1). Credit **one** mark for justification/exemplification of each weakness (AO3). For example: • Capafóns et al. (1998) only used participants who were afraid of flying in their study (1), therefore the results may not be the same for other phobias so cannot be generalised to systematic desensitisation for all phobias (1). • The participants replied to a media campaign so volunteered for the study which may cause the sample to be biased (1), as only those who were ready to have their phobia of flying treated may have responded to the media campaign (1). **Look for other reasonable answers.**	**(4)**

Question Number	Answer	Mark
8 (d)	**AO2 (1 mark), AO3 (1 mark)** Credit **one** mark for accurate identification of an application (AO2). Credit **one** mark for justification/exemplification of the application (AO3). For example: • One application from Capafóns et al. (1998) is that those with a fear of flying can be treated using a combination of imaginary and real tasks (1), as a combination of both techniques resulted in reduced fear of flying for 90% of the treatment group (1). **Look for other reasonable answers.**	**(2)**

Question Number	Indicative content	Mark
9	**AO1 (4 marks), AO2 (4 marks)** **AO1** • Systematic desensitisation aims to associate the feeling of calm with the phobic object to get rid of the fear, as a feeling of calm and fear cannot exist at the same time. • The therapist works with the client to create a hierarchy of fear where the client creates a list of situations that trigger their phobia from the least scary to the scariest. • The client is taught relaxation techniques such as deep breathing or imagining a calm, safe place. • Starting at the least fearful situation the client moves up the hierarchy of fear, using the relaxation techniques learnt so they are totally relaxed at one stage before moving up to the next stage. **AO2** • Earl's therapist will aim to make Earl feel calm around needles so that he can have the injections that will enable him to work in another country. • Earl will create a hierarchy of fear, with seeing a needle on the television as the least scary situation and having an injection as the scariest. • Earl may be taught how to breathe in deeply for the count of three, hold it for three and breathe out for three to use when he sees needles, as this will relax his body. • Earl will use the relaxation techniques when he sees a needle on the television and will not see a needle in real life until he is totally relaxed at this stage. **Look for other reasonable marking points.**	**(8)**

Level	Mark	Descriptor
AO1 (4 marks), AO2 (4 marks) Candidates must demonstrate an equal emphasis between knowledge and understanding vs application in their answer.		
	0	No rewardable material
Level 1	1–2 Marks	Demonstrates isolated elements of knowledge and understanding. (AO1) Provides little or no reference to relevant evidence from the context (scientific ideas, processes, techniques and procedures). (AO2)
Level 2	3–4 Marks	Demonstrates mostly accurate knowledge and understanding. (AO1) Discussion is partially developed, but is imbalanced or superficial occasionally supported through the application of relevant evidence from the context (scientific ideas, processes, techniques and procedures). (AO2)
Level 3	5–6 Marks	Demonstrates accurate knowledge and understanding. (AO1) Arguments developed using mostly coherent chains of reasoning. Candidates will demonstrate a grasp of competing arguments but discussion may be imbalanced or contain superficial material supported by applying relevant evidence from the context (scientific ideas, processes, techniques and procedures (AO2)
Level 4	7–8 Marks	Demonstrates accurate and thorough knowledge and understanding. (AO1) Displays a well-developed and logical balanced discussion, containing logical chains of reasoning. Demonstrates a thorough awareness of competing arguments supported throughout by sustained application of relevant evidence from the context (scientific ideas, processes, techniques or procedures). (AO2)

Section C

Question Number	Indicative content	Mark
10	**AO1 (6 marks), AO3 (6 marks)** **AO1** • Siffre (1975) spent six months in a cave with no external cues to see if this affected his circadian rhythms and found that they changed to a 25-hour cycle on average. • Czeisler et al. (1986) compared a woman's sleep patterns before and after they had been exposed to bright light for four hours for seven evenings in a row. • Experiments may be carried out on animals, such as mice, where the levels of daylight are controlled to see if this has any effect on the animals' sleep-wake cycles. • Aledavood et al. (2022) found a correlation between 400 students' high use of mobile phone in the morning or night and the times they woke up or went to sleep. • Experiments using animals to research the sleep-wake cycle try to control all other variables such as living conditions and food intake so the only variable that is changed is the amount of darkness the animals experience. • Case studies can be carried out where a small group of people are put into a dark environment and detailed data is collected, including data about the effect on their sleep patterns. **AO3** • Siffre was just one person so the results about the effects of external cues on his circadian rhythm may not be true for everyone, so his research is not an effective way to study circadian rhythms. • Czeisler et al's. (1986) study was empirical as they measured the level of bright light and how much her circadian rhythm changed; therefore it is a scientific and effective method of researching circadian rhythms. • The use of animals such as mice is an effective way to research the sleep-wake cycle as they have similar genes regulating their biological clock so the result may also be true for humans. • The use of the correlational research method by Aledavood et al. (2022) may not be an effective method to research the sleep-wake cycle as it does not tell us if the use of mobile phones affects the sleep-wake cycle or the sleep-wake cycle affects the use of mobile phones. • The use of animals in a controlled environment may not be an effective way to research natural sleep-wake cycles in humans as there are not such controls in everyday life, so the results may not be valid. • Case studies gather a lot of rich and detailed data about the sleep-wake cycle that can be both quantitative and qualitative, so they may be more valid than experiments and a more effective method to research circadian rhythms. **Look for other reasonable marking points.**	**(12)**

Level	Mark	Descriptor
AO1 (6 marks), AO3 (6 marks) Candidates must demonstrate an equal emphasis between knowledge and understanding vs judgement/conclusion in their answer.		
	0	No rewardable material.
Level 1	1–3 Marks	Demonstrates isolated elements of knowledge and understanding. (AO1) A judgement/decision may be presented, but will be generic and the supporting evidence will be limited. Limited attempt to address the question. (AO3)
Level 2	4–6 Marks	Demonstrates mostly accurate knowledge and understanding. (AO1) Candidates will produce statements with some development in the form of mostly accurate and relevant factual material leading to a judgement/decision being presented. Candidates will demonstrate a grasp of competing arguments but response may be imbalanced. (AO3)
Level 3	7–9 Marks	Demonstrates accurate knowledge and understanding. (AO1) Displays a mostly developed and logical argument, containing mostly coherent chains of reasoning. Demonstrates an awareness of competing arguments, presenting a judgement/decision which may be imbalanced. (AO3)
Level 4	10–12 Marks	Demonstrates accurate and thorough knowledge and understanding. (AO1) Displays a well-developed and logical argument, containing logical chains of reasoning throughout. Demonstrates an awareness of competing arguments and presents a balanced response, leading to a balanced judgement/decision. (AO3)

Question Number	Indicative content	Mark
11	**AO1 (6 marks), AO2 (4 marks), AO3 (6 marks)** **AO1** • Males with XYY syndrome are thought to have behavioural issues such as being more impulsive than XY males and may engage in more anti-social behaviour such as aggression. • A dysfunction in the MAOA gene means that monoamine oxidase cannot be broken down which affects the levels of neurotransmitters such as serotonin and noradrenaline. • Those with a dysfunction of the MAOA gene may more readily go into the flight or fight response because of the neurotransmitters, so leading to an increase in aggression. • Social learning theory states that we observe our role models' behaviour and then imitate it, which can include aggressive behaviour. • Role models are people that we look up to because they are similar to us, or have some sort of power, which may be due to their aggressive behaviour. • If a role model is reinforced for their aggressive behaviour, then that behaviour is more likely to be imitated in the hope that the imitator will get the same reward. **AO2** • Fred may have XYY syndrome as he is impulsive, such as throwing a plate at Eliza when they were arguing. • As the father has been in trouble for arguing and threatening a neighbour, he may have a dysfunction of the MAOA gene which Eliza and Fred have inherited explaining why they are aggressive. • As their father is male and has power over Fred then he may see the father as a role model and so imitate his behaviour such as shouting at Eliza. • Eliza saw Fred being rewarded with sweets after he had thrown a plate at her, so she may have thrown food at the other girl in the hope that she would also be rewarded. **AO3** • Theilgaard (1984) found that males with XYY syndrome provided more aggressive content and less anti-aggressive content to the stories from their Thematic Apperception Test, showing genes may explain why Fred is aggressive. • The MAOA gene may not explain all aggression as MAOA-L is very rare in women so there must be other reasons for their aggression, making it an incomplete explanation of aggression. • Eusebi et al. (2020) found that a more aggressive species of cattle had a lower number of repetitions of nucleotide 'C' in the MAOA gene so this could explain the aggression of the two children. • Charlton et al. (2000) found that the introduction of television to a remote island did not significantly increase aggressive behaviour, so Fred and Eliza may not have learnt their behaviour from role models. • Bandura Ross and Ross (1963) found that children who saw a cartoon character being aggressive had a mean total of 99 aggressive acts	**(16)**

	compared to a control group who had a mean total of 54 aggressive acts. • Social learning theory ignores the influence of biology, such as damage to the pre-frontal cortex, on aggressive behaviour so it is not a complete explanation of aggression. **Look for other reasonable marking points.**	

Level	Mark	Descriptor
AO1 (6 marks), AO2 (4 marks), AO3 (6 marks) Candidates must demonstrate an equal emphasis between knowledge and understanding vs evaluation/conclusion in their answer. Application to the context is capped at maximum 4 marks.		
	0	No rewardable material.
Level 1	1-4 Marks	Demonstrates isolated elements of knowledge and understanding. (AO1) Provides little or no reference to relevant evidence from the context (scientific ideas, processes, techniques & procedures). (AO2) A conclusion may be presented, but will be generic and the supporting evidence will be limited. Limited attempt to address the question. (AO3)
Level 2	5-8 Marks	Demonstrates mostly accurate knowledge and understanding. (AO1) Line(s) of argument occasionally supported through the application of relevant evidence from the context (scientific ideas, processes, techniques & procedures). (AO2) Candidates will produce statements with some development in the form of mostly accurate and relevant factual material, leading to a superficial conclusion being made. (AO3)
Level 3	9-12 marks	Demonstrates accurate knowledge and understanding. (AO1) Line(s) of argument supported by applying relevant evidence from the context (scientific ideas, processes, techniques & procedures). Might demonstrate the ability to integrate and synthesise relevant knowledge. (AO2) Arguments developed using mostly coherent chains of reasoning, leading to a conclusion being presented. Candidates will demonstrate a grasp of competing arguments but evaluation may be imbalanced. (AO3)
Level 4	13-16 Marks	Demonstrates accurate and thorough knowledge and understanding. (AO1) Line(s) of argument supported throughout by sustained application of relevant evidence from the context (scientific ideas, processes, techniques or procedures). Demonstrates the ability to integrate and synthesise relevant knowledge. (AO2) Displays a well-developed and logical evaluation, containing logical chains of reasoning throughout. Demonstrates an awareness of competing arguments, presenting a balanced conclusion. (AO3)

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