Please check the examination details below before entering your candidate information

Candidate surname	Other names
StemUp Model Solution	

Centre Number | Candidate Number

Pearson Edexcel International Advanced Level

Tuesday 20 May 2025

Afternoon (Time: 2 hours)

Paper reference **WPS02/01**

Psychology

International Advanced Subsidiary
UNIT 2: Biological Psychology, Learning Theories and Development

You do not need any other materials.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*

Information

- The total mark for this paper is 96.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- The list of formulae and statistical value tables are printed at the start of this paper.
- Candidates may use a calculator.

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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FORMULAE AND STATISTICAL TABLES

Standard deviation (sample estimate)

$$\sqrt{\left(\frac{\sum(x-\bar{x})^2}{n-1}\right)}$$

Spearman's rank correlation coefficient

$$1-\frac{6\sum d^2}{n(n^2-1)}$$

Critical values for Spearman's rank

	Level of significance for a one-tailed test				
	0.05	**0.025**	**0.01**	**0.005**	**0.0025**
	Level of significance for a two-tailed test				
N	**0.10**	**0.05**	**0.025**	**0.01**	**0.005**
5	0.900	1.000	1.000	1.000	1.000
6	0.829	0.886	0.943	1.000	1.000
7	0.714	0.786	0.893	0.929	0.964
8	0.643	0.738	0.833	0.881	0.905
9	0.600	0.700	0.783	0.833	0.867
10	0.564	0.648	0.745	0.794	0.830
11	0.536	0.618	0.709	0.755	0.800
12	0.503	0.587	0.678	0.727	0.769
13	0.484	0.560	0.648	0.703	0.747
14	0.464	0.538	0.626	0.679	0.723
15	0.446	0.521	0.604	0.654	0.700
16	0.429	0.503	0.582	0.635	0.679
17	0.414	0.485	0.566	0.615	0.662
18	0.401	0.472	0.550	0.600	0.643
19	0.391	0.460	0.535	0.584	0.628
20	0.380	0.447	0.520	0.570	0.612
21	0.370	0.435	0.508	0.556	0.599
22	0.361	0.425	0.496	0.544	0.586
23	0.353	0.415	0.486	0.532	0.573
24	0.344	0.406	0.476	0.521	0.562
25	0.337	0.398	0.466	0.511	0.551
26	0.331	0.390	0.457	0.501	0.541
27	0.324	0.382	0.448	0.491	0.531
28	0.317	0.375	0.440	0.483	0.522
29	0.312	0.368	0.433	0.475	0.513
30	0.306	0.362	0.425	0.467	0.504

The calculated value must be equal to or exceed the critical value in this table for significance to be shown.

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Chi-squared distribution formula

$$X^2 = \sum \frac{(O-E)^2}{E} \qquad df = (r-1)(c-1)$$

Critical values for chi-squared distribution

	Level of significance for a one-tailed test					
	0.10	**0.05**	**0.025**	**0.01**	**0.005**	**0.0005**
	Level of significance for a two-tailed test					
df	**0.20**	**0.10**	**0.05**	**0.025**	**0.01**	**0.001**
1	1.64	2.71	3.84	5.02	6.64	10.83
2	3.22	4.61	5.99	7.38	9.21	13.82
3	4.64	6.25	7.82	9.35	11.35	16.27
4	5.99	7.78	9.49	11.14	13.28	18.47
5	7.29	9.24	11.07	12.83	15.09	20.52
6	8.56	10.65	12.59	14.45	16.81	22.46
7	9.80	12.02	14.07	16.01	18.48	24.32
8	11.03	13.36	15.51	17.54	20.09	26.12
9	12.24	14.68	16.92	19.02	21.67	27.88
10	13.44	15.99	18.31	20.48	23.21	29.59
11	14.63	17.28	19.68	21.92	24.73	31.26
12	15.81	18.55	21.03	23.34	26.22	32.91
13	16.99	19.81	22.36	24.74	27.69	34.53
14	18.15	21.06	23.69	26.12	29.14	36.12
15	19.31	22.31	25.00	27.49	30.58	37.70
16	20.47	23.54	26.30	28.85	32.00	39.25
17	21.62	24.77	27.59	30.19	33.41	40.79
18	22.76	25.99	28.87	31.53	34.81	42.31
19	23.90	27.20	30.14	32.85	36.19	43.82
20	25.04	28.41	31.41	34.17	37.57	45.32
21	26.17	29.62	32.67	35.48	38.93	46.80
22	27.30	30.81	33.92	36.78	40.29	48.27
23	28.43	32.01	35.17	38.08	41.64	49.73
24	29.55	33.20	36.42	39.36	42.98	51.18
25	30.68	34.38	37.65	40.65	44.31	52.62
26	31.80	35.56	38.89	41.92	45.64	54.05
27	32.91	36.74	40.11	43.20	46.96	55.48
28	34.03	37.92	41.34	44.46	48.28	56.89
29	35.14	39.09	42.56	45.72	49.59	58.30
30	36.25	40.26	43.77	46.98	50.89	59.70
40	47.27	51.81	55.76	59.34	63.69	73.40
50	58.16	63.17	67.51	71.42	76.15	86.66
60	68.97	74.40	79.08	83.30	88.38	99.61
70	79.72	85.53	90.53	95.02	100.43	112.32

The calculated value must be equal to or exceed the critical value in this table for significance to be shown.

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Wilcoxon Signed Ranks test process

- Calculate the difference between two scores by taking one from the other
- Rank the differences giving the smallest difference Rank 1

  Note: do not rank any differences of 0 and when adding the number of scores, do not count those with a difference of 0, and ignore the signs when calculating the difference
- Add up the ranks for positive differences
- Add up the ranks for negative differences
- T is the figure that is the smallest when the ranks are totalled (may be positive or negative)
- N is the number of scores left, ignore those with 0 difference

Critical values for the Wilcoxon Signed Ranks test

	Level of significance for a one-tailed test		
	0.05	0.025	0.01
	Level of significance for a two-tailed test		
n	0.1	0.05	0.02
N=5	0	-	-
6	2	0	-
7	3	2	0
8	5	3	1
9	8	5	3
10	11	8	5
11	13	10	7
12	17	13	9

The calculated value must be equal to or less than the critical value in this table for significance to be shown.

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SECTION A

Biological Psychology

Answer ALL questions in this section. Write your answers in the spaces provided.

1 In your studies of biological psychology, you will have learned about the role of hormones in aggression.

(a) State **two** hormones that play a role in human aggression.

(2)

1 *Testosterone*

2 *Cortisol*

(b) Explain **two** strengths of hormones as an explanation of aggression.

(4)

1 *Hormones as an explanation of aggression are supported by research evidence, so the explanation is credible. Rieger et al. (2022) reviewed the current literature and found that a variety of hormones, including stress hormones and sex steroid hormones such as testosterone, were involved in aggression in rodents.*

2 *The explanation is scientific because it is falsifiable, so it can be tested and proved wrong. Hormone levels can be measured objectively, eg in blood or saliva, so if people with high testosterone were found to be no more aggressive than people with low testosterone, the theory would be shown to be incorrect.*

(Total for Question 1 = 6 marks)

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2 Amadeus carried out an experiment to see if there was a difference in the types of online games males and females played. He used a volunteer sample by posting a link to a questionnaire online. Those who were interested could click on the link and answer the questionnaire.

The questionnaire asked participants to name the three online games they played the most. Amadeus then counted the number of responses for the three most popular online games played by males and played by females.

(a) Name the experimental design used by Amadeus in his experiment.

(1)

An independent groups design, as males and females are different participants in each condition.

(b) Explain **one** weakness of Amadeus using a volunteer sampling technique for his experiment.

(2)

Those who chose to click the link and answer the questionnaire may have different characteristics from those who did not, so the sample is biased. For example, the volunteers may be people who spend much more time playing online games, so they are not representative of all male and female online game players.

(c) Identify the level of measurement used in Amadeus's experiment.

(1)

Nominal data, as he counted the number of responses for each online game in categories.

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Amadeus conducted a follow-up investigation to gather qualitative data. He sent a second questionnaire to those who had responded to the first questionnaire. In the second questionnaire, Amadeus asked his participants to explain why they liked playing the games they played.

(d) Explain **one** reason why Amadeus collected qualitative data in his follow-up investigation.

(2)

The first questionnaire only told Amadeus which games males and females played most, so he collected qualitative data to understand why they liked playing those games. Asking participants to explain their reasons in their own words gives rich, detailed data about their motives, which adds depth and validity to his findings.

(Total for Question 2 = 6 marks)

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3 In your studies of biological psychology, you will have learned about the structure of the brain as an explanation of aggression.

(a) Describe the structure of the brain as an explanation of aggression.

(4)

The pre-frontal cortex controls our behaviour and normally inhibits our impulses, so if it is damaged a person may not be able to delay gratification of their impulses and may become aggressive. The amygdala is part of the limbic system and processes emotions such as fear and anger; when it is stimulated we go into fight or flight mode and become aggressive if we decide to fight. If the amygdala is damaged it may misinterpret a situation as threatening when it is not, leading to aggressive behaviour. The hypothalamus controls homeostasis, so if it malfunctions it can lead to an excess of testosterone being released, increasing aggression.

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(b) Explain **one** strength and **one** weakness of the structure of the brain as an explanation of aggression.

(4)

Strength

There is research evidence to support it, giving the theory credibility. Matthies et al. (2012) found a 16 to 18% reduction in amygdala volume in people who were more aggressive, and the lower the amygdala volume the more aggressive the participant was, showing that brain structure does affect aggression.

Weakness

The explanation is reductionist as it ignores other factors, such as the effect of nurture on aggression. Social learning theory would argue that aggression is learned by observing and imitating the aggressive behaviour of role models, as shown by Bandura, Ross and Ross (1961), not caused by the brain.

(Total for Question 3 = 8 marks)

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4 Sunshine conducted a correlation to investigate whether there is a relationship between the number of absences from university lectures and the grade from the examination at the end of the year.

She went to her local university and asked psychology students in their first year at university to estimate how many lectures they had missed in the previous term. Sunshine then asked the university to provide her with the percentage of marks each student received in the end of year examination.

(a) Identify the **two** fully operationalised variables in Sunshine's correlation.

(2)

1 *The number of lectures each first year psychology student estimated they had missed in the previous term.*

2 *The percentage of marks each student received in the end of year psychology examination.*

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The results from Sunshine's correlation are shown in **Figure 1**.

A scatter diagram to show the relationship between the number of lectures missed in the previous term and the percentage scored in the end of year examination.

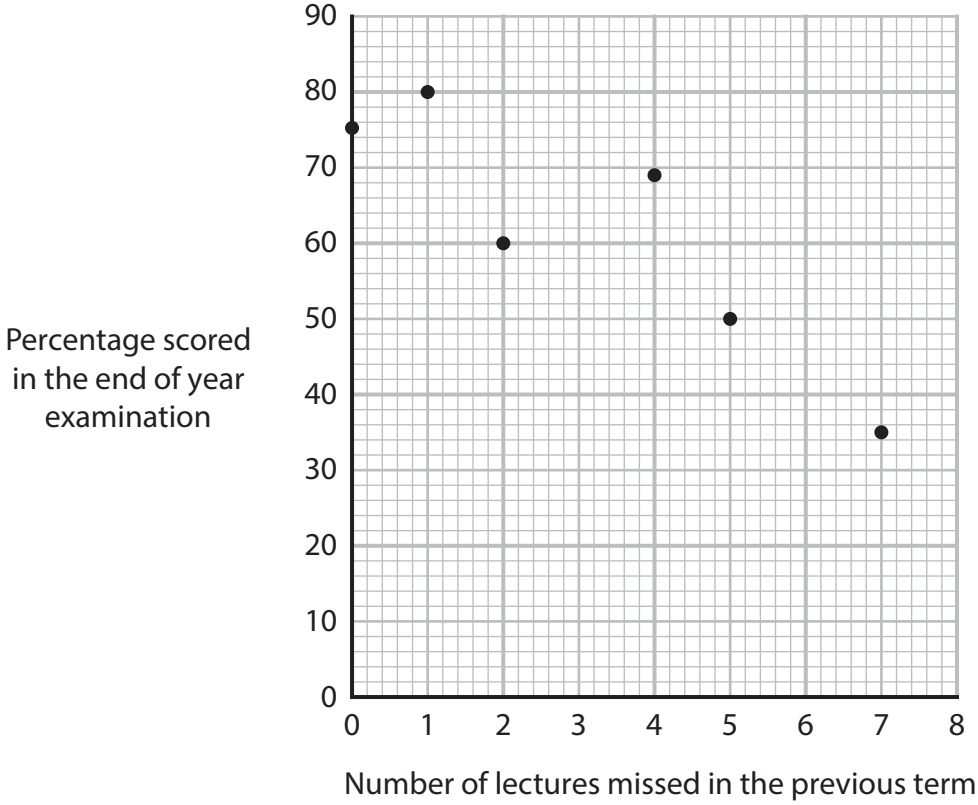


Figure 1

(b) Explain **one** conclusion Sunshine could make using the data in **Figure 1**.

(2)

As the number of lectures missed increases, the percentage scored in the exam decreases, eg the student who missed 1 lecture scored 80% but the student who missed 7 lectures scored 35%. Therefore Sunshine could conclude there is a negative correlation between the number of lectures missed and the end of year exam score.

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(c) Explain **one** improvement Sunshine could make to her investigation.

(2)

Sunshine could also ask students studying other subjects, such as medical or law students, at a range of universities, rather than only first year psychology students at her local university. Her sample would then be more representative of all university students, so her results would be more generalisable.

(Total for Question 4 = 6 marks)

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5 In your studies of biological psychology, you will have learned about Brendgen et al. (2005).

Assess the effectiveness of the study by Brendgen et al. (2005) in explaining aggression.

(8)

Brendgen et al. (2005) studied 234 pairs of six-year-old twins in Montreal, who had been assessed for zygosity at 18 months old, to find how far physical and social aggression are due to genes or environment. Both teachers and peers (classmates) answered questions, in French, about the aggression of the twins during the spring term. The peers were given a booklet of photographs of the children in the class and had to circle the photographs of the three children who best fitted descriptors such as "gets into fights with others". Brendgen et al. found that 50 to 60% of physical aggression was due to genetic factors, but only about 20% of social aggression was due to inherited factors, so social aggression was mainly explained by the environment.

A strength of the study is that the ratings were collected in the spring term, by which time the teachers and peers would know the twins well, so their answers are more likely to be accurate, making it an effective way to measure aggression. Using both teacher and peer ratings also meant one rater's opinion could be checked against others. Studying both physical and social aggression is more holistic than research that only focuses on physical aggression, so it gives a fuller explanation of aggression and shows that genes play a different role in different types of aggression.

However, zygosity was assessed using physical appearance (how alike the twins looked), so some twins may have been wrongly identified as monozygotic or dizygotic, which would affect the validity of the comparison of MZ and DZ twins. Also, asking peers to circle the photographs of three children may not be an effective measure of aggression, as six-year-olds' answers may be

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influenced by whether they had recently fallen out with a twin, and ratings are subjective rather than direct observations of aggressive behaviour. As the twins were mostly of European descent and from one city, the findings may not generalise to other cultures.

Overall, Brendgen et al. (2005) is fairly effective in explaining aggression because it used a large sample, several raters and two types of aggression, and it shows genes are important for physical aggression but environment matters more for social aggression. However, its subjective ratings and the way zygosity was assessed mean its conclusions about the genetic basis of aggression should be treated with some caution.

(Total for Question 5 = 8 marks)

TOTAL FOR SECTION A = 34 MARKS

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SECTION B

Learning Theories and Development

Answer ALL questions in this section. Write your answers in the spaces provided.

6 Jorge behaves badly at school. His teacher has decided to try and use operant conditioning to change his behaviour.

When Jorge sits still and concentrates on his work for five minutes, he is given a stamp on a reward card. After Jorge has collected 20 stamps, he can have a sweet. If Jorge distracts other children he is put on a table on his own, which he does not like.

(a) Identify the secondary reinforcement that is used with Jorge.

(1)

The stamp on the reward card that Jorge gets every time he sits still and concentrates for five minutes.

(b) Identify the negative reinforcement that is used with Jorge.

(1)

Avoiding being put on a table on his own, by not distracting the other children.

(c) The teacher will use a continuous reinforcement schedule with Jorge.

Explain **one** reason why this may not be the most effective reinforcement schedule to use with Jorge.

(2)

If Jorge gets a stamp every time he sits still and concentrates for five minutes, he will come to expect the reward every time. This means that when the stamps stop, extinction happens quickly and he will soon go back to distracting the other children and misbehaving at school.

(Total for Question 6 = 4 marks)

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7 Einor carried out an investigation to see if cats could be classically conditioned. He had two groups of different cats.

- Condition A: The cats heard the sound of a dog barking just before they were presented with food.
- Condition B: The cats heard no sound just before they were presented with food.

After four weeks of classically conditioning the cats in Condition A, Einor presented both groups of cats with the sound of dogs barking. He measured the saliva of all the cats in millilitres.

Einor's results for Condition A are shown in **Table 1**.

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(a) Calculate the standard deviation for the cats in Condition A to **two** decimal places for the data gathered by Einor by completing **Table 1**.

The formulae and statistical tables can be found at the front of the paper.

You **must** show your working out.

(4)

	Condition A: **Amount of saliva, in millilitres, in the cats that heard the dog barking when presented with food after four weeks of classical conditioning**	$x - \bar{x}$	$(x - \bar{x})^2$
A	4	−1.4	1.96
B	7	1.6	2.56
C	4	−1.4	1.96
D	9	3.6	12.96
E	3	−2.4	5.76
Mean = 5.4		Sum of differences^2 = 25.2	
Standard deviation = 2.51			

Table 1

Space for calculations

$s = \sqrt{(\Sigma(x - \bar{x})^2 \div (n - 1))}$

$\Sigma(x - \bar{x})^2 = 1.96 + 2.56 + 1.96 + 12.96 + 5.76 = 25.2$

$n - 1 = 5 - 1 = 4$

$25.2 \div 4 = 6.3$

$s = \sqrt{6.3} = 2.5099... = 2.51$ ml (2 d.p.)

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(b) Explain **one** ethical issue Einor should have considered before conducting his investigation with the cats.

(2)

Einor should have considered whether classically conditioning cats to salivate when they hear a dog barking is justified by the new knowledge it would bring. If the benefit is not certain, he should not have exposed the cats to the stressful sound of a dog barking or measured their saliva, which is a procedure that could cause them distress.

(c) Explain **one** practical improvement Einor could have made to his investigation with the cats.

(2)

Einor could have used a neutral sound when the cats were presented with food, such as a bell, rather than a dog barking. A bell would have no innate reflexive reaction (a dog barking may cause a fear response in cats) which could interfere with the salivation results, so his results would be more valid.

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(d) Einor then presented food to the cats without the sound of a dog barking. Three weeks later, the cats in Condition A heard a dog barking. When Einor measured the saliva, he found that the amount of salivation the cats produced after they heard the dog barking was increased.

Explain, using classical conditioning, **one** reason why the amount of saliva the cats produced had increased.

(2)

The salivation response had been extinguished when the food was presented without the barking, but after a three week rest the conditioned response returned when the cats heard the barking: spontaneous recovery. The association between the barking (CS) and food (UCS) was not lost, only suppressed, as Rescorla (1997) showed when rats' conditioned responses spontaneously recovered after extinction.

(Total for Question 7 = 10 marks)

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8 In your studies of learning theories and development, you will have learned about psychoanalysis as a therapy/treatment.

(a) Describe psychoanalysis as a therapy/treatment.

(4)

Psychoanalysis is a talking therapy based on Freud's theory which aims to bring unconscious thoughts and repressed memories into the conscious mind, so the client can gain insight into the cause of their issues. In dream analysis the client describes the manifest content of their dreams and the analyst interprets the latent content, ie what unconscious thoughts the dream symbols represent. In free association the client lies on a couch and says whatever comes into their mind without censoring it, in the hope that their defence mechanisms will weaken so unconscious thoughts are revealed. The client may also transfer unconscious feelings about an important person, such as a parent, onto the analyst (transference), and these feelings can then be interpreted and worked through.

(b) Explain **one** weakness of psychoanalysis as a therapy/treatment.

(2)

The analyst has to decide what the manifest content of the client's dreams means, which is subjective. So if the analyst does not interpret the dreams correctly, psychoanalysis will not identify the client's unconscious thoughts and will not be an effective treatment.

(Total for Question 8 = 6 marks)

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9 In your studies of learning theories and development, you will have learned about the study by Watson and Rayner (1920).

(a) Explain **two** weaknesses of the study by Watson and Rayner (1920).

(4)

1 *Watson and Rayner (1920) only used one 11-month-old boy, Little Albert, when conditioning a fear of rats, so the results may not be generalisable. Little Albert is not representative of adults or other children, who may not be as easy to condition by pairing a loud noise with a white rat.*

2 *The study was unethical as they deliberately made Little Albert cry and fear a white rat. This breaks the ethical principle of protection from harm, as Little Albert did not leave the study in the same psychological state as he entered it, because his fear was never extinguished.*

(b) Explain **one** improvement that could be made to the study by Watson and Rayner (1920).

(2)

Watson and Rayner could have conditioned a different reflexive response in Little Albert, such as eye blinking to a whistle paired with a puff of air. This would be more ethical as it would not have scared Little Albert or caused him distress, while still testing whether classical conditioning works in humans.

(Total for Question 9 = 6 marks)

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10 Navya has conducted an observation at a football match to see if male or female supporters behave differently during the match. She gained permission from the football club to carry out the observation, but the supporters did not know they were part of an observation.

Navya was in the crowd watching the match and wearing the colours of the local team. Her participants were the football supporters who sat in the three rows in front of her. Navya noted down every time males insulted the referee or a member of the opposing team, and every time females did the same.

Discuss Navya's use of the observational research method to see if male or female supporters behaved differently at the football match.

You **must** make reference to the context in your answer.

(8)

Navya carried out a naturalistic observation, which involves watching participants in their natural environment without manipulating it. She watched supporters at a real football match, so their behaviour was natural and her findings have high ecological validity, as they reflect how male and female supporters really behave during a match. However, as she had no control over the situation, extraneous variables such as how well the local team was playing or decisions by the referee could have affected how much supporters insulted people, so it is difficult to be sure any difference is due to gender, and the match could not be replicated exactly.

It was a covert observation, where the participants do not know they are being observed. Although Navya had permission from the football club, the supporters did not know they were part of her study, so they would not show demand characteristics or stop insulting the referee to look good, which increases validity. However, this raises ethical issues as the supporters could not give informed consent and were deceived. As a football match is a public place where people would expect to be seen, this may be acceptable, but Navya should still keep their identities confidential.

It was also a participant observation, as Navya was part of the group she was observing; she sat in the crowd wearing the colours of the local team. This let her blend in and see and hear the

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behaviour close up, so she could record insults the supporters in the three rows in front of her made that a distant observer might miss. However, as she was a home supporter herself she may be biased, eg not noticing insults to the opposing team, and it would be hard to record every insult while watching the match. As she was the only observer, there was no second observer to check inter-observer reliability.

Navya used event sampling, noting down every time a defined behaviour occurred, here every time a male or female insulted the referee or a member of the opposing team. This means she would not miss instances of insults, giving a full record of the behaviour. However, "insulting" needs to be clearly operationalised, eg shouting a rude word, otherwise she may record it inconsistently. Her sample of only three rows of supporters at one match is small and may not be representative of all male and female football supporters.

Overall, the observational method gave Navya valid, natural data on how male and female supporters behave, but the lack of control, possible observer bias and ethical issues mean her conclusions about gender differences should be treated with caution.

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(Total for Question 10 = 8 marks)

TOTAL FOR SECTION B = 34 MARKS

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SECTION C

Answer ALL questions in this section. Write your answers in the spaces provided.

11 Noah has been diagnosed with seasonal affective disorder. Every winter he feels depressed. Noah's symptoms include lacking the motivation to see his friends, or go to the gym. He also sleeps more during the winter months. Noah does not eat as much food in the winter months as he does not feel hungry.

Evaluate infradian rhythms as an explanation of Noah's seasonal affective disorder.

You **must** make reference to the context in your answer.

(12)

An infradian rhythm is a biological rhythm that lasts longer than 24 hours. Seasonal affective disorder (SAD) is an infradian rhythm because it follows a yearly cycle of about 12 months, with depression returning at the same time each year. Noah's SAD fits this, as every winter he feels depressed, so his symptoms follow a 12-month cycle.

In winter there is less daylight. As it gets dark earlier, the pineal gland produces more melatonin, which makes people feel more tired, and the lack of daylight affects the sleep-wake cycle so people want to sleep for longer. This explains why Noah sleeps more during the winter months. The extra hours of darkness and higher melatonin may also make Noah feel lethargic, which could explain why he does not feel hungry and eats less food in winter. A lack of sunshine can also decrease the level of serotonin in the brain, which can make a person feel depressed and lacking in motivation. Reduced serotonin may explain why Noah lacks the motivation to see his friends or go to the gym.

There is research evidence that SAD is due to an infradian rhythm. Wehr et al. (2001) found that people with SAD produced a biological signal indicating that the season was changing, similar to the signal in other mammals that change their behaviour with the seasons, whereas healthy people did not. This suggests Noah's winter depression may be caused by a seasonal, infradian biological rhythm, which supports the explanation.

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Another strength is that the explanation has practical applications. Knowing that a lack of light affects SAD has led to light therapy, where people sit in front of a bright light box each day in winter to make up for the missing daylight, reducing melatonin and raising serotonin. This means Noah could manage his symptoms, eg using a light box in the morning so he has the energy and motivation to see his friends and go to the gym.

However, Sigurðardóttir and Grigaraviciuté (2018) found a relationship between being an evening type person and SAD. This suggests that it may be a circadian rhythm, the evening chronotype, that affects SAD rather than an infradian rhythm, so Noah's symptoms may be due to his daily rhythm being out of step with the short winter days. This weakens infradian rhythms as a complete explanation.

The explanation is also reductionist as it ignores social factors. In winter Noah may not see as many friends or go out as much because of the cold and dark weather, and this social isolation itself could lead to his depression rather than biological factors. It also cannot explain why not everyone exposed to the short winter days develops SAD, which suggests individual differences, such as genes, may make some people more vulnerable.

In conclusion, infradian rhythms provide a good explanation of Noah's SAD, as his symptoms of depression, oversleeping and low appetite return every winter and can be linked to changes in melatonin and serotonin caused by reduced daylight, which is supported by Wehr et al. (2001) and the success of light therapy. However, the role of circadian chronotype and social factors means infradian rhythms are unlikely to be the only explanation, so Noah's SAD is best explained by an interaction of biological and social factors.

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12 Mila is 22 years old and has been arrested for fighting after she hurt a woman whilst in a restaurant. Mila said the other woman was rude to her. Mila's mother has been rude to Mila in the past.

Mila has previously thrown a book at a person in her local book club after disagreeing with what the person said about a book. Mila was warned that if she was aggressive again, she would no longer be able to go to the book club. After the arrest, Mila can no longer go to her local book club.

Mila became homeless after the arrest when her father threw her out of the house because she was rude and aggressive to her stepmother. Mila said it was her stepmother's fault that Mila was rude and aggressive, as the stepmother takes all her father's attention away from Mila.

To what extent can genes and Freud's psychosexual stages of development explain Mila's aggressive behaviour?

You **must** refer to the context in your answer.

(16)

The genetic explanation suggests that aggression is inherited. The MAOA gene codes for the enzyme monoamine oxidase A, which breaks down neurotransmitters such as serotonin and dopamine in the synapse. People with the low activity variant, MAOA-L, do not produce enough of this enzyme, so these neurotransmitters are not broken down properly. This disrupts serotonin regulation, so the person may not be able to control their impulses and becomes more aggressive. Mila may have the MAOA-L gene, which would make her more likely to act impulsively and aggressively, explaining why she hurt a woman in a restaurant and was arrested for fighting, and why she threw a book at a person in her book club as soon as she disagreed with them, without controlling her anger.

Freud's theory suggests that our personality is shaped by unconscious drives and by how we pass through the psychosexual stages: oral, anal, phallic, latency and genital. In the phallic stage (about 3 to 6 years) a girl unconsciously desires her father and sees her mother as a rival, which Freud called the Electra complex. It is resolved when the girl identifies with her same-sex parent. If the conflict is not resolved, it can lead to problems as an adult, which may include being overly aggressive. Aggression may also be an unconscious impulse that is displaced, as we

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cannot be aggressive towards the person we really want to be aggressive to.

Mila may not have successfully resolved her Electra complex, as she is jealous of her stepmother for taking her father's attention away from her and sees her as a rival, which is why she was rude and aggressive towards her. Mila may also have unconscious anger towards her mother, who has been rude to her in the past. When the woman in the restaurant was rude to her, Mila may have displaced this repressed anger onto the woman, as she was rude just like her mother, explaining why she hurt her.

There is research evidence to support the genetic explanation. Brunner et al. (1993) studied a Dutch family in which many males showed impulsive aggression and violence, and found they had a mutation of the MAOA gene that meant they lacked the enzyme. Im et al. (2019) found that males with the MAOA-L gene showed changes in heart rate when presented with stimuli that provoked aggression. This suggests the MAOA-L gene could explain Mila's aggressive behaviour. However, both studies were of males, so the findings may not generalise to Mila as a female. Other genetic explanations, such as males with an extra Y chromosome (XYY) being more aggressive, cannot apply to Mila at all.

The genetic explanation has scientific credibility, as genes and aggression can be measured and empirically tested, eg using DNA samples and twin studies such as Brendgen et al. (2005), who found that 50 to 60% of physical aggression was due to genes. However, this also shows genes do not explain all aggression. The explanation is reductionist and deterministic, as it ignores nurture. For example, Mila may have learned to be rude and aggressive by observing her mother being rude to her, as social learning theory would suggest. Also, being banned from the book club after her warning did not stop her aggression, so her behaviour is not simply controlled by consequences, which may support a biological, impulsive cause.

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Freud's theory is supported by his case study of Little Hans (1909), who was found to be going through the Oedipus complex during the phallic stage, which explained his fear of horses. This suggests that Mila's aggression towards her stepmother may be due to her psychosexual development. However, Little Hans was a single case study of a boy, interpreted by Freud using information from Hans's father, so it is subjective and cannot be generalised. Freud's theory is hard to falsify, as concepts such as the unconscious and the Electra complex cannot be measured, making it unscientific and less credible than the genetic explanation of Mila's aggression.

Freud's theory also focuses on early childhood and ignores factors that occurred in adulthood, so it may not be a complete explanation of Mila's aggression as a 22-year-old. For example, Mila's homelessness after the arrest and being banned from her book club are recent stressors that could increase her aggression. However, a strength of Freud's theory is that it can explain why Mila's aggression seems directed at particular people, such as her stepmother and the rude woman, which the genetic explanation cannot.

In conclusion, genes can explain to a large extent why Mila is generally impulsive and aggressive, and this explanation is more scientific and better supported by evidence than Freud's theory. Freud's psychosexual stages can explain why her aggression is targeted at her stepmother and at people who remind her of her mother, but this cannot be tested. As neither explanation considers her environment, such as learning from her mother, Mila's aggression is best explained by an interaction of genetic predisposition and her experiences.

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