Please check the examination details below before entering your candidate information

Candidate surname	Other names
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Centre Number | Candidate Number

Pearson Edexcel International Advanced Level

Wednesday 24 May 2023

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 (a) Describe the role of **one** hormone that influences aggression.

(2)

Testosterone is a male sex hormone thought to increase aggression. Exposure to high levels of testosterone in the womb affects how the brain develops, and after birth high testosterone increases activity in the hypothalamus and amygdala, so the person is more likely to respond aggressively when they are provoked or their dominance is challenged.

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(b) Explain **one** strength and **one** weakness of hormones as an explanation of aggression.

(4)

Strength

Research supports the role of testosterone. Dabbs et al. (1987) found that male prisoners with higher levels of testosterone in their saliva had more often been convicted of violent crimes, and 10 of the 11 inmates with the highest testosterone had committed violent crimes, which gives the hormone explanation credibility.

Weakness

Hormones are not a complete explanation of aggression. Bird et al. (2016) found that testosterone did not increase aggression towards a same-sex rival, but males who scored highly on narcissism were more aggressive, so personality and social factors also need to be considered.

(Total for Question 1 = 6 marks)

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2 Harold conducted an investigation to see if the number of hours spent playing online games affected aggression. He asked his participants to spend no more than one hour a day playing online games for the first week of his investigation. In the second week of his investigation the participants could spend up to seven hours a day playing online games.

Harold asked his participants to record how many aggressive thoughts they had each day. He then calculated the total number of aggressive thoughts for each participant in each week.

(a) Identify the independent variable (IV) and the dependent variable (DV) in Harold's investigation.

(2)

Independent variable

Whether the participants played online games for no more than one hour a day (week 1) or for up to seven hours a day (week 2).

Dependent variable

The total number of aggressive thoughts each participant recorded in week 1 and in week 2.

(b) Once he had collected the data Harold calculated a Wilcoxon Signed Ranks test on the data.

Explain **one** reason why Harold conducted a Wilcoxon Signed Ranks test on his data.

(2)

Harold used a repeated measures design, which the Wilcoxon test is for, because the same participants recorded their aggressive thoughts in both week 1 (up to one hour of gaming a day) and week 2 (up to seven hours a day). He was also looking for a difference between the two weeks, and the number of aggressive thoughts was treated as ordinal data.

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Harold's results are shown in **Table 1**.

Participant	Number of aggressive thoughts recorded in week 1	Number of aggressive thoughts recorded in week 2	Difference	Ranked Difference
A	2	0	2	3
B	7	8	−1	1.5
C	5	9	−4	4
D	1	1	0	not ranked
E	12	7	5	5
F	3	3	0	not ranked
G	2	3	−1	1.5

Table 1

(c) Calculate the T value for the data gathered by Harold 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)

Space for calculations

Difference = week 1 − week 2

Ignore D and F (difference 0), so N = 5

Differences without signs: 2, 1, 4, 5, 1

In order: 1, 1, 2, 4, 5 ⇒ ranks 1.5, 1.5, 3, 4, 5

Sum of ranks for positive differences = 3 (A) + 5 (E) = 8

Sum of ranks for negative differences = 1.5 (B) + 4 (C) + 1.5 (G) = 7

T = the smaller total = 7

T = 7

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(d) Explain **one** improvement Harold could make to his investigation.

(2)

Harold could make all participants play the same violent online game in both weeks. At the moment some participants may have played non-violent games, so making the type of game the same would control this extraneous variable and he could be more sure that the extra hours of gaming caused any change in aggressive thoughts, improving validity.

(Total for Question 2 = 10 marks)

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3 (a) Describe research into the circadian sleep-wake cycle.

(2)

Research into the circadian sleep-wake cycle often uses case studies in which a person is isolated from natural light and other zeitgebers, such as clocks, to see how their cycle changes. Siffre (1972) spent six months in a cave with no daylight and found his sleep-wake cycle became free-running and longer than 24 hours, at times extending to a 48-hour cycle.

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(b) Explain **one** strength and **one** weakness of research into the circadian sleep-wake cycle.

(4)

Strength

Some research uses animals, where areas of the brain such as the suprachiasmatic nucleus (SCN) can be lesioned. This allows researchers to find out which brain areas control the circadian sleep-wake cycle, which could not ethically be done with humans.

Weakness

Case studies such as Siffre (1972) use only one person, so the results are not representative. Other people's sleep-wake cycles may not lengthen in the same way or to the same length, so the findings cannot be generalised to the wider population.

(Total for Question 3 = 6 marks)

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4 Adeliza conducted a correlation to see if there was a relationship between the number of hours slept per night and mood. The higher the score for mood, out of ten, the more positive the mood. She hypothesised that the more hours slept the more positive the mood.

Adeliza calculated a Spearman Rho to see if her results were significant at $p \leqslant 0.05$.

(a) State what is meant by the term $p \leqslant 0.05$.

(1)

There is a 5% or less probability that the relationship between hours slept and mood score is due to chance.

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Adeliza's results are shown in **Figure 1**.

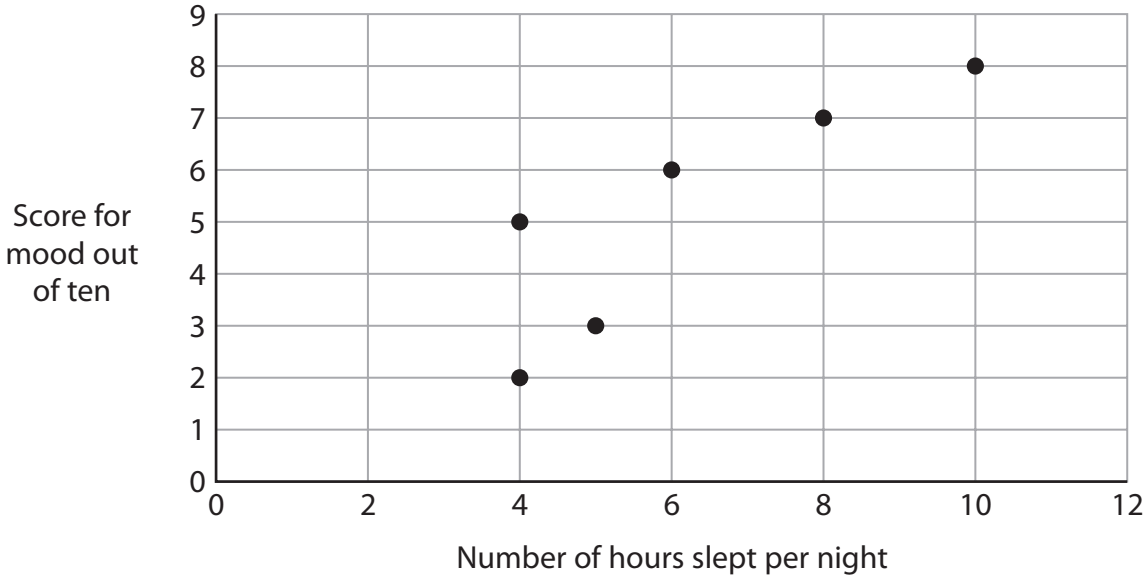


Figure 1

(b) Identify what type of correlation Adeliza found using the data in **Figure 1**.

(1)

A positive correlation: as the number of hours slept per night increased, the score for mood also increased.

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(c) Explain **one** weakness of Adeliza using a correlation for her study.

(2)

Adeliza can only say there is a relationship between hours slept and mood; she cannot conclude cause and effect. More sleep could cause a more positive mood, a positive mood could lead to more sleep, or a third variable such as stress could affect both.

(Total for Question 4 = 4 marks)

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5 In your studies of biological psychology you will have conducted a practical investigation.

Discuss ethics and reliability in relation to your practical investigation.

(8)

Our practical was a correlation between the number of hours students slept per night and the number of hours they spent on social media per day, measured using a self-report questionnaire given to students at our school.

Informed consent means participants agree to take part knowing exactly what will happen and how their data will be used. We told our participants we were looking for a relationship between sleep and social media use before they agreed, and only asked people aged 16 or over so parental consent was not needed. We also gave them the right to withdraw, and each questionnaire was given a number instead of a name to keep the data confidential.

Participants should not be harmed physically or emotionally. Our participants were not harmed as they only answered questions about their sleep and social media use and we did not manipulate them in any way. However, some students may have felt embarrassed admitting how little they slept, so a debrief was given at the end.

A study is reliable if it can be repeated and similar results are found, which needs a standardised procedure and controlled extraneous variables. Several groups in our class carried out the same investigation with different participants and all found a negative correlation between hours slept and hours on social media, suggesting our findings were reliable. The questionnaire used the same closed questions for everyone, so it could easily be replicated.

However, some extraneous variables were not controlled. Some participants completed the questionnaire alone while others filled it in with friends, who may have influenced their

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answers, so a replication may not find the same results. Overall our practical was ethical, but its reliability could have been improved by making everyone complete the questionnaire in the same quiet setting.

(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 In your studies about learning theories and development you will have learnt about operant conditioning.

(a) Describe what is meant by the term 'secondary reinforcement' in operant conditioning.

(2)

A secondary reinforcer does not satisfy a basic biological need such as hunger itself, unlike a primary reinforcer such as food. It becomes rewarding because it is associated with a primary reinforcer and can be used to gain access to one, for example money can be exchanged for food.

(b) Explain **one** strength of operant conditioning.

(2)

Operant conditioning is a more complete explanation of learning than classical conditioning, because it explains how new voluntary behaviours are learned through their consequences, rather than only how reflexes become associated with new stimuli, so it explains more human behaviour.

(Total for Question 6 = 4 marks)

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7 Stephen conducted an experiment using rats. He investigated whether positive reinforcement, using alcohol, would teach rats to press a lever. He placed individual rats in a box for a week, as shown in **Figure 2**.

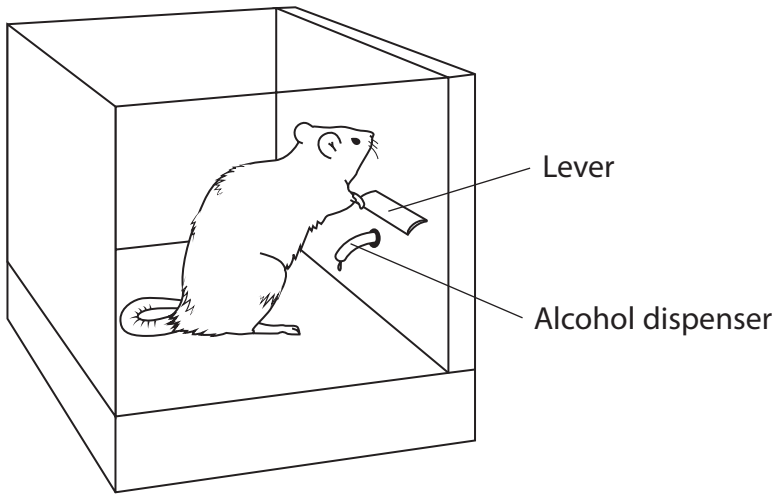


Figure 2

- Condition A: One group of 50 rats got a reward of a drink of alcohol after pressing a lever.
- Condition B: A different group of 50 rats did not get any reward after pressing a lever.

After the rats had been in the box for a week Stephen measured how many times the rats in each condition pressed the lever within five minutes.

(a) State a fully operationalised directional (one-tailed) hypothesis for Stephen's experiment.

(2)

Rats that receive a drink of alcohol every time they press the lever for a week will press the lever more times within five minutes than rats that receive no reward for pressing the lever.

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Stephen calculated the mean number of times the rats had pressed the lever.
Stephen's results are shown in **Table 2**.

Condition	Mean number of times the rats pressed the lever within 5 minutes
Rats got a drink of alcohol after pressing a lever	13
Rats did not get any reward after pressing the lever	4

Table 2

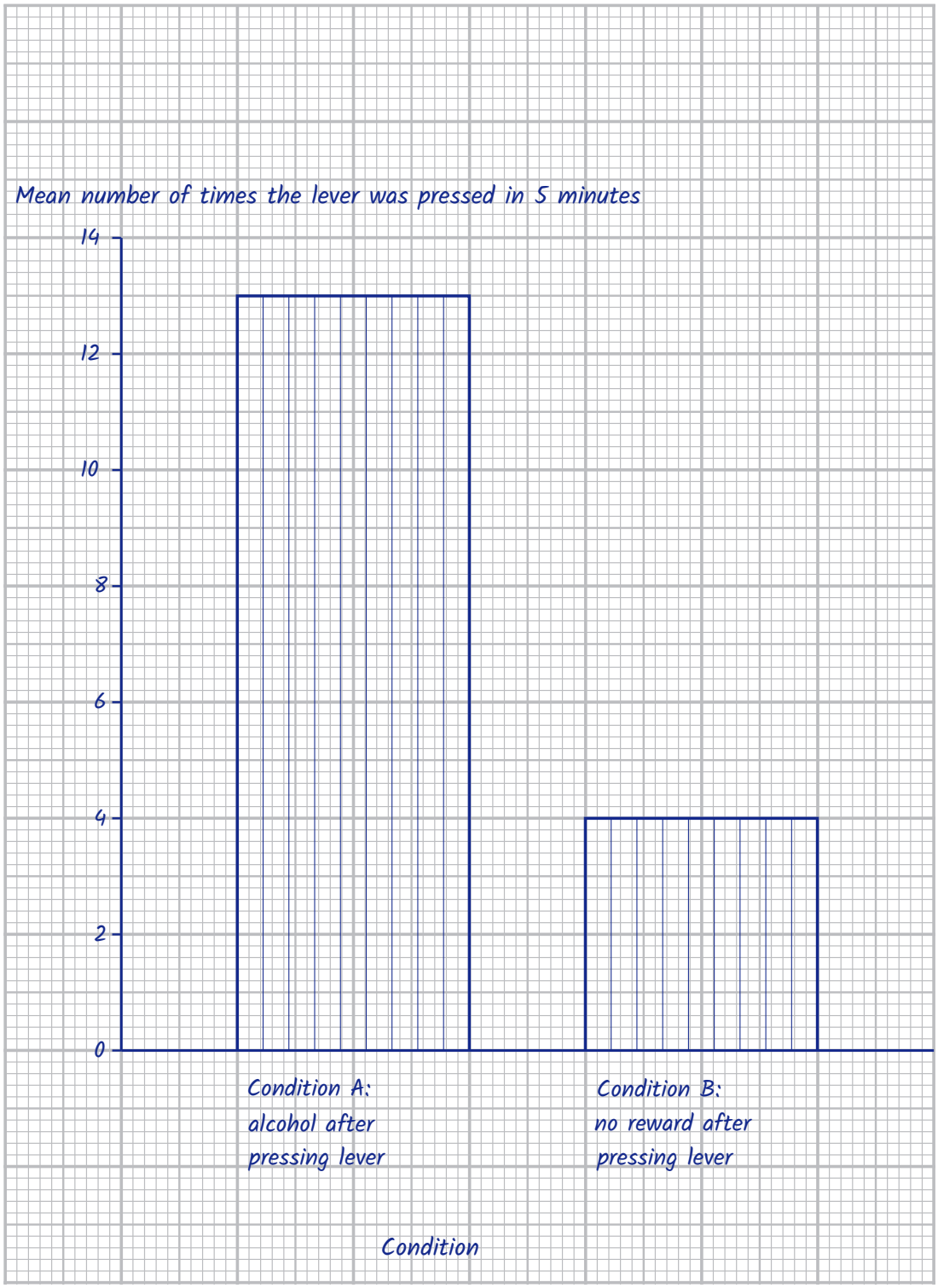
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(b) Draw a graph of Stephen's results using the data in **Table 2.**

(3)

Title

Bar chart of the mean number of times rats pressed the lever in 5 minutes, with and without alcohol reward



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(c) Explain **one** conclusion Stephen could make using the data from **Table 2.**

(2)

Stephen could conclude that alcohol acts as a positive reinforcer for rats, as the rats that got alcohol after pressing the lever pressed it a mean of 13 times in five minutes compared with 4 times for rats with no reward, which is 9 more presses on average.

(d) Explain **two** improvements Stephen could make to his experiment in terms of ethics.

(4)

1 *Stephen could use fewer rats, for example 10 in each condition instead of 50, as the Animals (Scientific Procedures) Act (1986) states that the minimum number of animals needed to meet the research aims should be used, so fewer animals would be exposed to possible harm.*

2 *Stephen could use a different positive reinforcer, such as a sweet drink, instead of alcohol. The rats would be less likely to become addicted or suffer withdrawal, so they would be less likely to experience long-term physical or psychological distress.*

(Total for Question 7 = 11 marks)

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8 Phillipa was training her dog to give her its paw every time she said the word 'paw'. She decided to use a fixed ratio schedule of reinforcement using dog treats.

(a) Describe how Phillipa could use a fixed ratio schedule of reinforcement with her dog.

(2)

Phillipa would give the dog a treat after it had given her its paw a set number of times when she said "paw". For example, she could give a treat every fifth time the dog gave its paw, so the dog learns that a fixed number of responses earns a reward.

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(b) Compare classical conditioning and operant conditioning as explanations of learning.

(4)

One difference is that classical conditioning explains a more limited range of behaviour than operant conditioning, because classical conditioning only explains how involuntary reflex responses become associated with a new stimulus, whereas operant conditioning explains how voluntary behaviours are learned through reinforcement and punishment.

One similarity is that both say we learn from the environment through association. In classical conditioning a neutral stimulus is associated with an unconditioned stimulus, and in operant conditioning a behaviour is associated with its consequence, such as a reward.

(Total for Question 8 = 6 marks)

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9 In your studies of learning theories and development you will have learnt about the contemporary study in detail by Capafóns et al. (1998).

(a) State the sampling technique used by Capafóns et al. (1998).

(1)

Volunteer (self-selected) sampling.

(b) Explain **two** ways that Capafóns et al. (1998) controlled extraneous variables in their study.

(4)

1 *They used the same published fear of flying scales with all participants at the start and end of the study, so any differences in fear of flying could be put down to whether participants received the treatment, rather than to different measures being used for the different groups.*

2 *The treatment group and the no-treatment group were matched at the start for their self-reported fear of flying, so any difference in the results was not because one group began with a higher level of fear, which adds to the validity of the study.*

(Total for Question 9 = 5 marks)

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10 Evaluate Freud's psychosexual stages of development.

(8)

Freud proposed that children pass through five psychosexual stages, in each of which the libido is focused on a different area of the body: oral (0 to 1 year), anal (1 to 3), phallic (3 to 6), latency and genital. If a child is over-indulged or under-indulged at a stage they become fixated, which affects their adult personality, for example under-indulgence in the oral stage may lead to an envious, pessimistic or sarcastic adult. In the anal stage pleasure comes from retaining or expelling faeces and the ego develops. In the phallic stage the child goes through the Oedipus or Electra complex and resolves it by identifying with the same-sex parent, which develops the superego.

A strength is that there is some supporting evidence. In the case of Little Hans (1909), Hans's fear of horses was resolved once he had worked through the Oedipus complex and identified with his father, which gives the theory credibility. The theory is also useful, as psychoanalysis is based on it and can help people resolve problems that stem from not passing successfully through a stage.

However, the theory is unscientific because it cannot be falsified. Adult problems are explained by childhood stages and the stages are inferred from adult problems, so the argument is circular. Little Hans was a single case, and the evidence was gathered by his father, who knew Freud's ideas, so it is open to bias. Freud also mainly based his ideas on neurotic, middle-class European women, so people from other cultures may not pass through the stages in the same way.

In conclusion, Freud's stages were an important first attempt to link childhood experiences to adult personality and have practical uses in therapy, but because they cannot be tested

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scientifically and rely on a biased sample, they should be treated with caution.

(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 To what extent is systematic desensitisation an effective therapy/treatment?

(12)

Systematic desensitisation is a therapy based on classical conditioning, developed by Wolpe, that is mainly used to treat phobias. It works on the principle of reciprocal inhibition: a person cannot be relaxed and anxious at the same time, so the aim is for the client to associate the phobic object with relaxation instead of fear. First the therapist and client discuss how the anxiety shows itself and what triggers it. The client then builds a hierarchy of fear, from the least to the most anxiety-provoking situation. They are taught relaxation techniques such as deep breathing, and are then exposed, in imagination or in real life, to each step of the hierarchy, only moving up once they are fully relaxed at the previous step.

There is strong evidence that it is effective. Capafóns et al. (1998) found that participants with a fear of flying who received systematic desensitisation showed a reduced fear of flying compared with a control group who received no treatment. Bulantika et al. (2018) found that it reduced social anxiety in adolescents from a mean score of 63.75 to 41. Both studies show it can reduce anxiety for different phobias.

It may also be more effective than flooding for many clients, because it is gradual and the client is in control of moving up the hierarchy, so they are less likely to drop out and more likely to complete the therapy. This makes it more ethical as it causes less distress.

However, its effectiveness is limited. It is mainly used for phobias and anxiety, so it is not an effective treatment for other disorders such as depression or seasonal affective disorder. Ougrin (2011) found that exposure therapy was as effective as cognitive behavioural therapy for panic disorder, but CBT was more effective for social phobia, so other therapies may sometimes be

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better. Psychodynamic psychologists argue that a phobia is a symptom of an unconscious conflict, which systematic desensitisation does not address, so the underlying cause remains and symptom substitution may occur. It also relies on the client being able to relax and vividly imagine the feared situation, which not everyone can do.

Overall, systematic desensitisation is an effective treatment for specific phobias and some anxiety disorders, as shown by Capafóns et al. (1998) and Bulantika et al. (2018), and it is more acceptable to clients than flooding. However, it is less effective for disorders other than phobias and for social phobia CBT may work better, so its effectiveness depends on the disorder being treated.

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12 Berengaria is 20 years old. She comes from a family that is known to be aggressive. Her father has been to prison for hurting someone in a fight. Her mother frequently gets into arguments with the neighbours and recently threw a stone at a neighbour's house.

Berengaria enjoys watching violent films. Her favourite actress has recently starred in a film where the actress was involved in using her skills in kickboxing to fight a group of people.

The police recently came to Berengaria's house to question her about a fight that she had with another girl. The other girl alleges that Berengaria used kickboxing moves and stole her phone.

Evaluate the role of genes and social learning theory as explanations of Berengaria and her family's aggression.

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

(16)

Genetic explanations suggest that aggression is inherited. The MAOA gene produces an enzyme that breaks down neurotransmitters such as noradrenaline, serotonin and dopamine. If the gene is dysfunctional these are not broken down, so the person becomes more sensitive to the fight or flight response and more likely to be aggressive. It was also once thought that XYY syndrome, where a male has an extra Y chromosome, caused aggression in men.

Berengaria comes from a family that is known to be aggressive. Her father may have an extra Y chromosome, which could explain why he hurt someone in a fight and went to prison. Her mother may have a dysfunctional MAOA gene, so she goes into fight mode with the neighbours, arguing with them and throwing a stone at their house. Berengaria may have inherited a low-activity MAOA gene from her parents, explaining her own fight with the other girl.

McDermott (2008) supports genes, as participants with low MAOA activity were more likely to give hot sauce to an opponent who had taken their earnings. However, XYY syndrome only occurs in males, as females have no Y chromosome, so it cannot explain the aggression of Berengaria or her mother. Also, the MAOA gene works by affecting neurotransmitters, so

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genes alone are not a complete explanation, and genes cannot explain why Berengaria used the specific skill of kickboxing.

Social learning theory says aggression is learned by observing and imitating role models. We must pay attention to the behaviour, retain it, be able to reproduce it, and be motivated to imitate it, for example because the model was vicariously reinforced or because we are directly rewarded when we imitate it. We are more likely to imitate models who are similar to us, such as the same gender, or who have high status.

Berengaria has observed her parents' aggression throughout her childhood, so she may have learned that fighting is a way to deal with conflict. Her favourite actress is the same gender and a celebrity, so she is a relevant, high-status role model, and Berengaria watched her use kickboxing to fight a group of people. This explains why Berengaria allegedly used kickboxing moves. Stealing the phone would act as reinforcement, as she gained something she wanted, so she is more likely to be aggressive again.

Bandura, Ross and Ross (1961) found that children who watched an adult model being aggressive to a Bobo doll were more aggressive to the doll than children who saw a non-aggressive model, supporting social learning theory. Anderson and Murphy (2003) found that females who played Street Fighter gave more loud noise blasts to opponents than those who played Lemmings, which supports Berengaria learning from violent films. However, Bandura's studies used young children, so they may not apply to a 20-year-old adult who can think of other ways to deal with a situation, and the Bobo doll is not a real person so the aggression lacks validity.

Both explanations struggle to separate nature and nurture, as Berengaria shares genes with

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her parents and has also grown up observing them. Overall, social learning theory explains the specific form of her aggression, such as kickboxing, better than genes, but genes such as a low-activity MAOA gene may create a predisposition that her environment then triggers, so an interactionist explanation is most complete for Berengaria and her family.

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