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

Time 2 hours

Paper reference **WPS02/01**

Psychology

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

Calculators may be used.

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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Q:1/1/

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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) Define what is meant by the term 'external zeitgeber'.

(1)

An external zeitgeber is an environmental cue, such as daylight or social cues, that resets and helps regulate our biological rhythms, such as the sleep-wake cycle.

(b) Explain **two** strengths of the role of external zeitgebers in explaining the regulation of the sleep-wake cycle.

(4)

1 Siffre (1975) spent six months in a cave with no external cues such as daylight, and his sleep-wake cycle extended to about 25 hours. This shows that external zeitgebers such as light are needed to keep our sleep-wake cycle at 24 hours, which gives the explanation credibility.

2 Skene and Arendt (2007) found that most blind people with some light perception have normal circadian rhythms, unlike blind people with no light perception. This shows that light as an external zeitgeber regulates circadian rhythms, including the sleep-wake cycle, so it is a plausible explanation.

(Total for Question 1 = 5 marks)

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2 Harrison conducted an experiment into the effect of antidepressants on people who had seasonal affective disorder. He allocated his participants into one of two different conditions.

- Condition A: Given antidepressants.
- Condition B: Not given antidepressants.

Harrison asked all the participants to record their mood in a daily diary for a month. He used a rating scale from 1 (happy mood) to 7 (low mood). When he had collected the data, Harrison then calculated an average mood score for each participant over the month.

(a) State a fully operationalised null hypothesis for Harrison's experiment.

(2)

There will be no difference in the average mood score for the month, rated from 1 (happy mood) to 7 (low mood), between participants with seasonal affective disorder who were given antidepressants and those who were not given antidepressants. Any difference will be due to chance.

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

Condition A: Participants were given antidepressants	Average mood score for the month from 1 to 7	Condition B: Participants were not given antidepressants	Average mood score for the month from 1 to 7
A	2	G	4
B	4	H	5
C	1	I	3
D	3	J	5
E	2	K	6
F	2	L	3

Table 1

(b) Calculate the mean score for **Condition B**. You **must** give your answer to **two** decimal places.

(1)

Space for calculations

(4 + 5 + 3 + 5 + 6 + 3) ÷ 6 = 26 ÷ 6 = 4.333...

Mean score for **Condition B** 4.33

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(c) Calculate the median score for **Condition A**.

(1)

Space for calculations

In order: 1, 2, 2, 2, 3, 4 ⇒ (2 + 2) ÷ 2 = 2

Median score for **Condition A** *2*

(d) Harrison calculated the standard deviation for both conditions. The standard deviations are shown in **Table 2**.

Standard deviation for condition A: Participants were given antidepressants	Standard deviation for condition B: Participants were not given antidepressants
1.03	1.21

Table 2

Explain what the standard deviations show about Harrison's results.

(2)

The standard deviation for those given antidepressants (1.03) is only 0.18 lower than for those not given antidepressants (1.21). So there is very little difference in the spread of mood scores around the mean between the two conditions, although the mood scores of those given antidepressants were slightly more consistent.

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(e) Explain **one** weakness of Harrison's experiment.

(2)

Harrison asked participants to rate their own mood from 1 to 7, so those given antidepressants may have shown demand characteristics. They may have guessed the aim was to see if the antidepressants improved their mood and rated themselves as happier than they were, which reduces the validity of the experiment.

(Total for Question 2 = 8 marks)

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3 In your studies of biological psychology you will have learned about the following classic study in detail:

- Raine et al. (1997).

(a) Describe the results of the classic study by Raine et al. (1997).

(3)

Raine et al. (1997) found that the 41 murderers who pleaded not guilty by reason of insanity (NGRI) had lower glucose metabolism in the prefrontal cortex than the matched control group. The murderers also had lower activity in the left angular gyrus and superior parietal gyrus, and in the corpus callosum. They showed abnormal asymmetries, with lower activity in the left amygdala, hippocampus and thalamus and higher activity in the right side compared to controls. There was no significant difference in glucose metabolism in the lateral temporal lobe.

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(b) Explain **one** strength and **one** weakness of the classic study by Raine et al. (1997).

(4)

Strength

Raine et al. (1997) matched each NGRI murderer with a control of the same age and sex, and six murderers with schizophrenia were matched with six controls with schizophrenia. This increases validity, as the differences in brain activity are unlikely to be due to other factors such as mental illness.

Weakness

Raine et al. (1997) only used murderers who pleaded not guilty by reason of insanity. This limits the generalisability of the results, as the same brain activity may not be found in murderers who did not plead insanity or in other violent offenders.

(Total for Question 3 = 7 marks)

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4 Meryl has decided to carry out an investigation to determine whether there is a relationship between hormones and aggression. She gathered 13 participants through volunteer sampling. Meryl measured the participants' cortisol levels and how aggressive they had been over the past week.

(a) Describe the procedure Meryl could have used for her investigation.

(4)

Meryl could put up an advert asking for people interested in a study on hormones and aggression, giving the time and place, and use the first 13 people who respond and give informed consent. She could take a saliva swab from each participant at the same time of day, as cortisol levels change during the day, and measure the amount of cortisol in each sample. Participants would then complete a questionnaire asking how many times they were physically and verbally aggressive during the past week. Meryl should check that none of the participants had any stressful life events in the past few weeks that may have made them more aggressive than normal. She would then rank the cortisol levels and aggression scores and debrief the participants.

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(b) After she had carried out her investigation Meryl conducted a Spearman's rank test on her data. She found a calculated value of 0.569.

Explain whether Meryl found a significant correlation for a two-tailed (non-directional) test at $p \leqslant 0.05$.

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

(2)

Meryl did find a significant correlation between cortisol and aggression. This is because with N = 13 for a two-tailed test at p≤0.05 the critical value is 0.560, and her calculated value of 0.569 is equal to or greater than 0.560, so she can reject the null hypothesis.

(Total for Question 4 = 6 marks)

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5 Sylvester has lost his job as a security guard at a shop due to his aggression. He had previously been verbally aggressive to customers, and in the latest incident kicked a customer after he had thrown them out of the shop.

Sylvester is currently single. His last relationship ended after he shouted at his partner. He has been banned from watching his local football team after he was involved in a fight with supporters of a rival team.

Discuss how brain functioning could account for Sylvester's aggression.

You must make reference to the context in your answer.

(8)

The amygdala detects threats in the environment. If it misinterprets a situation as threatening, it can trigger a fight response that increases aggression. Sylvester works as a security guard, so he may be constantly looking for threats, and his amygdala may have processed the customer as a threat, which is why he kicked them even after he had already thrown them out of the shop.

When the amygdala is activated it can bypass the rational part of the brain, the prefrontal cortex (PFC), so we are less likely to think about the consequences of being aggressive. The PFC normally controls our impulses, but if it has low activity or is damaged we are less able to control aggressive urges. This could explain why Sylvester did not think about losing his job when he was verbally aggressive to customers, and why he could not control his impulse to fight the rival football supporters, so he was banned. Raine et al. (1997) supports this, as murderers who pleaded insanity had lower glucose metabolism in the PFC than controls.

The hypothalamus keeps testosterone levels in homeostasis. If it is damaged, too much testosterone may be released, which can increase aggression. This could explain why Sylvester shouted at his partner, which ended his relationship, as his aggression is not limited to one situation but happens at work, at home and at football.

However, brain functioning may not fully account for Sylvester's aggression. Brain scans show a correlation, so low PFC activity could be a result of aggressive behaviour rather than its cause.

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Social learning theory offers another explanation, as Sylvester may have imitated aggressive role models, such as other football supporters who were reinforced for fighting. Football matches are also very competitive and crowded, so situational factors may have caused the fight.

Overall, brain functioning explains well why Sylvester reacts to threats impulsively in many different situations, but it is reductionist, so his aggression is more fully explained when learning and the environment are also considered.

(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 (a) Describe what is meant by the 'role of the unconscious' according to Freud.

(2)

The unconscious is the largest part of the mind and contains thoughts, desires and memories, often from childhood, that we cannot cope with emotionally, so they are repressed. We are not aware of what is in the unconscious, but it still motivates and influences our behaviour.

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(b) Explain **one** strength and **one** weakness of Freud's psychosexual stages of development.

(4)

Strength

Freud's case study of Little Hans (1909) found that Hans's fear of horses was really an unconscious fear of his father. This shows Hans was going through the Oedipus complex in the phallic stage, so it supports Freud's psychosexual stages.

Weakness

The psychosexual stages are not scientific, as features such as the unconscious and the Oedipus complex cannot be directly observed or measured. This means the theory cannot be tested or falsified, so it lacks empirical evidence.

(Total for Question 6 = 6 marks)

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7 Sigourney conducted an observation to see if positive reinforcement led to children reading more at home. She used a random sampling technique to collect her participants from one village. Sigourney allocated the parents and children into one of two different conditions.

- Condition A: The parents praised the children every time they sat down and read silently.
- Condition B: The parents did not praise the children when they sat down and read silently.

She recorded parents and children interacting during their reading time at home for a week. Sigourney then watched the recordings at a later date.

(a) Describe how Sigourney could use a random sampling technique for her observation.

(2)

Sigourney could collect the names of all the children in the village and put them into a computer program. The program would then randomly select names until she had enough children and their parents for her observation on positive reinforcement.

(b) Explain **one** strength of Sigourney using a random sampling technique.

(2)

Every child in the village had an equal chance of being chosen, so the sample is not affected by researcher bias. Sigourney should get a variety of children, such as those who enjoy reading and those who do not, so her results are more representative.

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(c) Explain **one** improvement Sigourney could make to her sample.

(2)

Sigourney could use parents and children from a variety of villages and towns rather than just one village. This would make the results more representative of all parents and children, so the effect of positive reinforcement on reading could be generalised.

Sigourney also collected qualitative data. She wrote down what the parents said to their children when they praised them for reading. Sigourney did not collect any data from other sources.

(d) Explain **one** weakness of Sigourney using qualitative data for her observation.

(2)

When analysing what the parents said, Sigourney has to decide which comments fit into which themes, which may be subjective. What she classes as praise or positive reinforcement another researcher may not, so the analysis may be biased and lack reliability.

(e) Explain **one** improvement Sigourney could make to how she collected her qualitative data.

(2)

Sigourney could also gather data from other sources, such as asking teachers whether the children were praised for reading at school. This would stop positive reinforcement from other parts of the children's lives having a confounding effect on her results.

(Total for Question 7 = 10 marks)

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8 Patricia is scared of beards. Her new boss has a beard and it is affecting her ability to do her job. She has decided to try systematic desensitisation to reduce her fear of beards. Patricia goes to a local therapist.

(a) Describe how systematic desensitisation could be used with Patricia to reduce her fear of beards.

(4)

The therapist and Patricia first discuss what triggers her anxiety, such as seeing a beard, and how the anxiety shows itself, such as Patricia sweating. Patricia then creates a hierarchy of fear with the therapist, from the least feared situation, such as looking at a picture of a beard, up to the most feared, such as standing next to her boss. The therapist teaches Patricia relaxation techniques such as deep breathing, as fear and relaxation cannot exist at the same time. Patricia then works through each step of the hierarchy, such as seeing a real beard at a distance, using the relaxation techniques at each stage until she is calm before moving to the next step.

(b) Explain **one** weakness of using systematic desensitisation to treat Patricia's fear of beards.

(2)

It may not cure the cause of Patricia's fear, as the psychodynamic approach would argue the unconscious reason for her fear of beards has not been addressed. So her fear may be replaced with another fear (symptom substitution), which may still affect her job.

(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 following classic study in detail:

- Watson and Rayner (1920).

Describe the results of the classic study by Watson and Rayner (1920).

At 11 months and 10 days, when the white rat was presented alone, Albert reached towards it but pulled his hand away before he touched it. After more pairings, when the rat was shown alone, Albert began to cry, turned away and crawled away rapidly. At 11 months and 15 days his fear had generalised: he leaned away from and cried at a rabbit, and showed negative responses to a dog, a fur coat, cotton wool and a Santa Claus mask, but played happily with his building blocks. When he was taken to a bright, well-lit lecture room, he moved his hand away from the rat but did not cry, so his responses were less intense in a new setting.

(Total for Question 9 = 4 marks)

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10 Assess how far social learning theory explains human behaviour.

(8)

Social learning theory (SLT) states that we learn by observing and imitating the behaviour of role models. A role model is someone we identify with because they are relevant to us, such as being the same gender, or have high status. For a behaviour to be imitated, the observer must pay attention to it, retain it in memory, be able to reproduce it and be motivated to do so. If the role model is rewarded, the observer receives vicarious reinforcement and is more likely to reproduce the behaviour.

Bandura (1965) found that children who saw an aggressive model being rewarded showed more aggressive behaviour than those who saw the model punished, supporting the role of vicarious reinforcement. Perez et al. (2018) found that a mother's body dissatisfaction positively predicted her daughter's body dissatisfaction, showing that human behaviour can be explained by observing relevant role models in real life, not just in the lab.

However, Charlton et al. (2000) found that after television was introduced to St Helena, there was no significant increase in antisocial behaviour in children, so observing behaviour does not always lead to imitation. SLT also does not explain all learned behaviour, such as insight learning, where we suddenly understand the solution to a problem without observing anyone. It also ignores biological factors, such as testosterone, that may make some people more likely to imitate aggression.

Overall, SLT explains how many behaviours are learned from role models and is supported by experimental and real-life evidence, but because observation does not always lead to imitation, it only partly explains human behaviour.

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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 Michelle is scared of fireworks due to the loud noise they make. She has attended several parties at her friend's house where they had fireworks. Michelle has now developed a fear of her friend's house. She has also developed a fear of going to her grandparents' house as they live in a similarly designed house to her friend.

Evaluate classical conditioning as an explanation of Michelle's fear.

You must make reference to the context in your answer.

(12)

Classical conditioning is learning new reflexes through association. Before conditioning, an unconditioned stimulus (UCS) causes an unconditioned response (UCR), a natural reflex. For Michelle, the UCS was the loud noise of the fireworks, which caused the UCR of fear. Her friend's house was originally a neutral stimulus (NS), as it caused no fear response.

During conditioning, the NS is paired with the UCS. Michelle attended several parties at her friend's house where there were fireworks, so the house was repeatedly paired with the loud noise. After conditioning, the house became a conditioned stimulus (CS) and fear became a conditioned response (CR), so Michelle is now scared of her friend's house even when there are no fireworks.

Stimulus generalisation is when the CR is given to stimuli similar to the CS. Michelle has generalised her fear to her grandparents' house because it is similarly designed to her friend's house, even though she has never heard fireworks there.

Watson and Rayner (1920) support this, as they made Little Albert afraid of a white rat by pairing it with a loud noise, and his fear generalised to similar objects such as a rabbit, just as Michelle's fear spread to a similar house. Classical conditioning is also scientific, as it studies observable behaviour such as the NS causing no response before pairing, so it can be tested in

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controlled experiments.

However, there are other explanations for Michelle's fear. Operant conditioning could explain why it is maintained, as avoiding the houses reduces her anxiety, which negatively reinforces the avoidance, and she may receive attention from her friend as positive reinforcement when she shows she is scared. Classical conditioning would also predict that her fear should extinguish if she visits the houses without fireworks. It focuses on nurture and ignores nature, such as hormones or an inherited tendency towards anxiety, and it cannot explain why other guests at the parties did not develop a fear of the house.

In conclusion, classical conditioning explains well how Michelle's fear of her friend's house developed through association with the fireworks and spread to her grandparents' house through generalisation. However, it does not explain why the fear is maintained or why only Michelle developed it, so it is not a complete explanation.

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(Total for Question 11 = 12 marks)

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12 In your studies of biological psychology and learning theories and development you will have learned about the following studies in detail:

- Brendgen et al. (2005)
- Skinner (1948) Superstition in the pigeon.

Evaluate Brendgen et al. (2005) and Skinner (1948) in terms of ethical considerations and reliability.

(16)

Brendgen et al. (2005) studied 234 pairs of six-year-old twins from Montreal, of which 94 pairs were monozygotic (MZ), to see whether social and physical aggression are due to genes or the environment. Teachers rated each twin on social and physical aggression using items based on the Preschool Social Behaviour Scale, and classmates gave peer ratings by circling photos of children who fitted statements about aggressive behaviour. Around 60% of the variance in social aggression was due to unique environmental factors and 20% to shared environmental factors, whereas physical aggression was largely explained by genetic factors.

Skinner (1948) used eight hungry pigeons kept at 75% of their normal body weight. Each was placed in a cage for a few minutes a day, and a food hopper was swung into the cage for five seconds at regular intervals, regardless of what the pigeon was doing. Six of the eight pigeons developed superstitious behaviours that they repeated between reinforcements, such as turning counter-clockwise or thrusting the head into a corner of the cage.

In terms of ethics, Brendgen et al. (2005) gained active written consent from the parents of the twins before collecting data, so informed consent was obtained for children too young to consent themselves, and the children's identities were kept confidential. However, the children could have been distressed if they found out that classmates had circled them for behaviours such as telling mean secrets about another child, so the peer ratings risked psychological harm.

Skinner's study raises ethical issues, as the pigeons were deliberately starved to 75% of their

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body weight so the food would be reinforcing, which caused them hunger and possible distress. However, Skinner only used eight pigeons, which keeps the number of animals to a minimum, and the procedure itself did not physically harm them. Pigeons are living vertebrates, so today the study would have to meet guidelines such as the Animals (Scientific Procedures) Act 1986, and it could have been more ethical to use a species that is not protected.

In terms of reliability, Brendgen et al. (2005) totalled the number of times each twin was circled for each statement, which gives objective quantitative data that the researchers did not need to interpret, and they used both teacher and peer ratings, so the findings could be checked against each other. However, the children's choices may depend on who their friends were on that day, so if the peer ratings were repeated on a different day they may not circle the same twins. Also, social aggression does not fully develop until around eight years old, so the results may not be the same if the study was repeated on the twins when they were older.

Skinner's study has high reliability because it was highly controlled and standardised, for example the food hopper was always swung in for five seconds, so extraneous variables were unlikely to affect the results and the procedure can be replicated. Two observers counting the pigeons' behaviours had perfect agreement in six out of eight cases, showing inter-rater reliability. However, with only eight pigeons, and each pigeon developing a different behaviour, it is hard to be sure the findings are consistent.

In conclusion, Brendgen et al. (2005) was more ethical, as it gained consent and did not deprive participants, although the peer ratings risked distress, while Skinner's food deprivation of the pigeons is harder to justify. Skinner's tightly controlled lab procedure makes it more reliable than Brendgen et al. (2005), whose ratings of young children may change over time and between days.

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