Write your name here

Surname
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Other names

Pearson Edexcel
International Advanced Level

Centre Number

Candidate Number

Psychology

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

Wednesday 26 October 2016 – Afternoon
Time: 2 hours

Paper Reference
WPS02/01

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 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.
- 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**
4	1.000	1.000	1.000	1.000	1.000
5	0.700	0.900	0.900	1.000	1.000
6	0.657	0.771	0.829	0.943	0.943
7	0.571	0.679	0.786	0.857	0.893
8	0.548	0.643	0.738	0.810	0.857
9	0.483	0.600	0.683	0.767	0.817
10	0.442	0.564	0.649	0.733	0.782
11	0.418	0.527	0.609	0.700	0.755
12	0.399	0.504	0.587	0.671	0.727
13	0.379	0.478	0.560	0.648	0.698
14	0.367	0.459	0.539	0.622	0.675
15	0.350	0.443	0.518	0.600	0.654
16	0.338	0.427	0.503	0.582	0.632
17	0.327	0.412	0.482	0.558	0.606
18	0.317	0.400	0.468	0.543	0.590
19	0.308	0.389	0.456	0.529	0.575
20	0.299	0.378	0.444	0.516	0.561
21	0.291	0.369	0.433	0.503	0.549
22	0.284	0.360	0.423	0.492	0.537
23	0.277	0.352	0.413	0.482	0.526
24	0.271	0.344	0.404	0.472	0.515
25	0.265	0.337	0.396	0.462	0.505
26	0.260	0.330	0.388	0.453	0.496
27	0.255	0.323	0.381	0.445	0.487
28	0.250	0.317	0.374	0.437	0.479
29	0.245	0.312	0.367	0.430	0.471
30	0.241	0.306	0.361	0.423	0.463

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.

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 BEGINS ON THE NEXT PAGE.

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SECTION A

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

1 Researchers investigated the performance of textile workers during their night shifts. The mean number of mistakes were calculated and recorded in relation to the number of consecutive nights worked. The results are shown in **Table 1** below.

Participant	Number of consecutive nights worked	Mean number of mistakes made
1	3	6
2	8	10
3	5	8
4	9	12
5	7	8
6	11	14
7	12	14
8	14	16

Table 1

(a) The researchers used the correlational research method.

Define what is meant by the correlational research method.

(1)

The correlational method measures two co-variables to see whether there is a relationship between them, without manipulating an independent variable.

(b) Explain **one** strength of the correlational research method.

(2)

Correlations allow researchers to study naturally occurring variables, such as the number of consecutive nights worked, that it would be unethical or impractical to manipulate in a laboratory experiment. This means real-life relationships can still be studied and can suggest ideas for later experimental research.

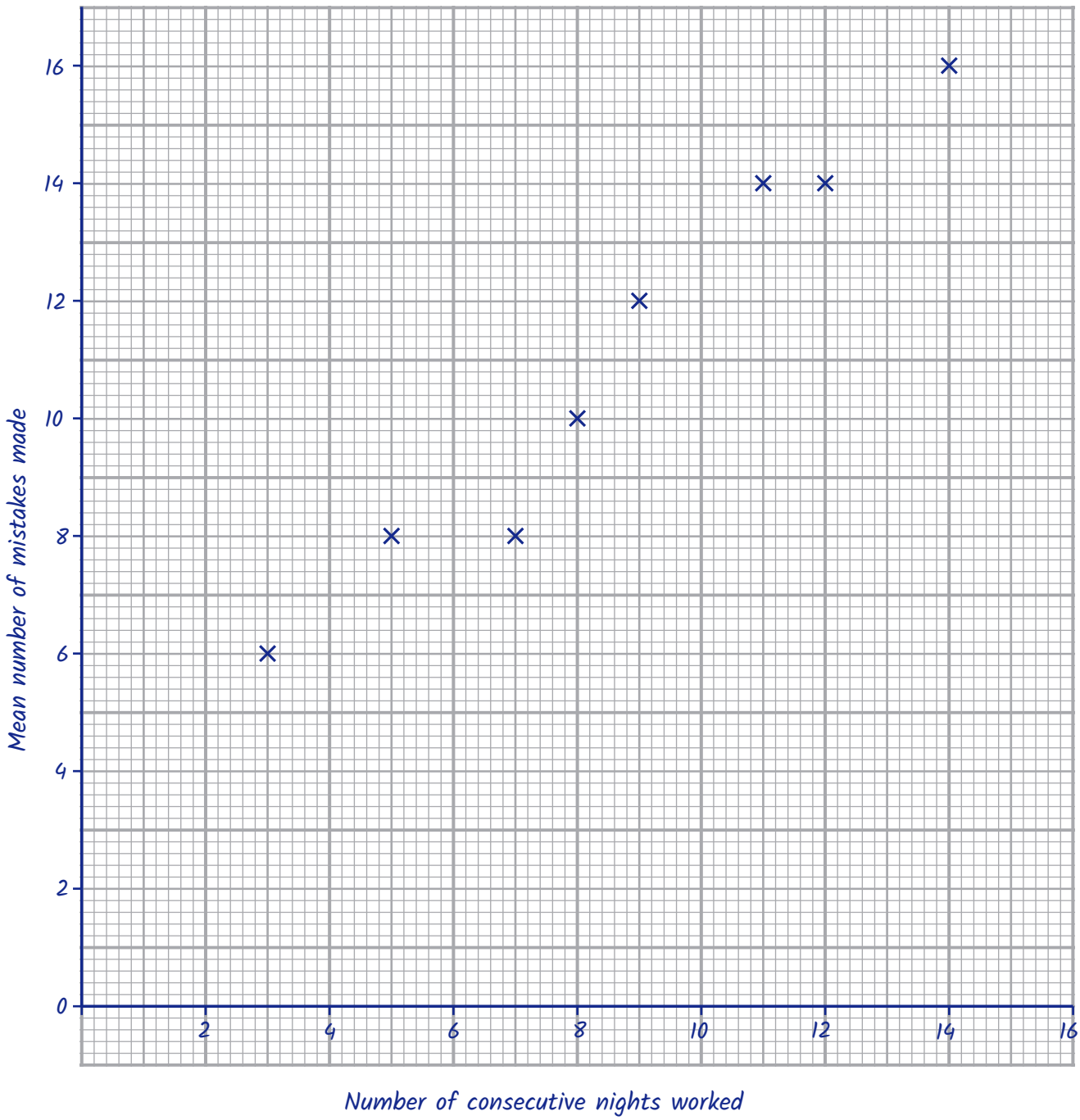
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(c) Draw a scatter diagram to show the results from this research.

(3)

Title *Scatter diagram of consecutive nights worked and mean number of mistakes made*



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(d) Describe the type of correlation shown in the scatter diagram you have drawn.

(2)

A positive correlation. As the number of consecutive nights the textile workers worked increases, the mean number of mistakes made also increases, for example from 6 mistakes after 3 nights to 16 mistakes after 14 nights, and the points lie close to a straight line, so it is fairly strong.

(e) State which statistical test you could use to determine whether there is a relationship between the number of consecutive nights worked and the mean number of mistakes made.

(1)

Spearman's rank correlation coefficient (Spearman's rho).

(Total for Question 1 = 9 marks)

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2 In biological psychology you will have covered a contemporary study by Brendgen et al (2005).

(a) State **two** aims of the study by Brendgen et al (2005).

(2)

1 *To find out to what extent social aggression and physical aggression are explained by genetic factors, shared environmental factors or non-shared environmental factors.*

2 *To compare the contribution of genes and environment to social aggression with their contribution to physical aggression in 6-year-old twins.*

(b) Give **one** conclusion from the study by Brendgen et al (2005).

(1)

Physical aggression is influenced by a mixture of genetic factors and non-shared environmental factors, whereas social aggression is explained mainly by environmental factors.

(c) Explain **two** strengths of the study by Brendgen et al (2005).

(4)

1 *The study used a twin design, comparing identical (MZ) twins, who share 100% of their genes, with non-identical (DZ) twins, who share about 50%. As both types of twin are brought up in the same family, greater similarity in aggression between MZ twins than DZ twins can be put down to genes, so the researchers could separate the effects of genes and environment on aggression.*

2 *Aggression was rated by both teachers and peers (classmates) rather than by one source. Using two independent sources of data means the ratings could be compared with each other, so the findings about social and physical aggression are more reliable and less affected by the bias of a single rater.*

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(d) Suggest **one** way Brendgen et al (2005) could improve their study.

(2)

They could carry out a longitudinal follow-up, rating the same twins' aggression again in later childhood and adolescence. This would show whether the influence of genes and environment on social and physical aggression changes with age, as findings from 6-year-olds may not generalise to older children.

(Total for Question 2 = 9 marks)

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3 In biological psychology you will have conducted a practical investigation.

(a) State the fully operationalised hypothesis from your biological practical investigation.

(2)

There will be a significant positive correlation between a participant's height measured in centimetres and their aggression score (out of 20) on a self-report questionnaire of aggressive tendencies.

(b) Explain **one** ethical issue you took into consideration when planning your biological practical investigation.

(2)

We gained informed consent, as the questionnaire asked about participants' own aggressive behaviour, which is a sensitive topic. We explained what the questionnaire was about before they began, so they could choose whether to take part, and told them about their right to withdraw and that their answers would be anonymous.

(c) Describe how you gathered the quantitative data in your biological practical investigation.

(4)

We gathered two sets of quantitative data from each of our 20 participants. First, each participant's height was measured in centimetres with a tape measure against a wall, with their shoes removed, and recorded in a results table. Second, each participant completed a questionnaire of 10 closed questions about aggressive behaviour, such as "I lose my temper easily", each answered on a scale from 0 (never) to 2 (often). The answers were tallied and added together to give an aggression score out of 20, with a higher score meaning more aggressive tendencies. Each participant's height and aggression score were recorded as a pair so they could be plotted on a scatter diagram and analysed using Spearman's rank.

(Total for Question 3 = 8 marks)

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4 Evaluate whether the role of neurotransmitters can fully explain human behaviour.

(8)

Neurotransmitters are chemical messengers that pass signals between neurones. When an impulse reaches the presynaptic terminal, neurotransmitters are released from vesicles into the synaptic gap and bind to receptors on the postsynaptic neurone, either exciting it so it is more likely to fire, or inhibiting it. In this way they allow the brain to process thoughts, memories and emotions. For example, serotonin is an inhibitory neurotransmitter involved in mood and emotion, dopamine is linked to reward and movement, and acetylcholine is involved in memory and sleep.

There is evidence that neurotransmitters do explain behaviour. Low serotonin has been linked to depression and impulsive aggression, and SSRIs, which increase serotonin in the synapse, reduce depressive symptoms, suggesting serotonin plays a causal role in mood. Schizophrenia has been linked to excess dopamine activity, and drugs that block dopamine receptors reduce symptoms. Martinez and Kesner (1991) found that rats given a drug that increased acetylcholine learned a maze faster, while rats given a drug that blocked acetylcholine were slower, showing memory can be explained by neurotransmitters. This evidence is scientific and objective, as drug levels can be controlled and effects measured.

However, much of this evidence comes from animals such as rats, so it may not generalise to complex human behaviour. The explanation is also reductionist, as it ignores other biological factors such as hormones and genes, as well as psychological explanations. Social learning theory explains behaviour such as aggression through observation and imitation of role models, as Bandura et al. (1961) showed, and Freud explains behaviour through unconscious conflicts. The evidence is often correlational too: it is unclear whether low serotonin causes depression or depression lowers serotonin, and SSRIs do not work for everyone.

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In conclusion, neurotransmitters play an important role in behaviours such as mood, memory and aggression, but they cannot fully explain human behaviour. Behaviour is better explained by an interaction between neurotransmitters, other biological factors and the environment.

(Total for Question 4 = 8 marks)

TOTAL FOR SECTION A = 34 MARKS

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SECTION B

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

5 Stuart is a four-year-old boy who enjoys spending time with his mother. His father decided to take him on a fishing trip. Stuart became afraid and said he did not want to go.

(a) Identify which Freudian psychosexual stage Stuart is in.

(1)

The phallic stage.

(b) Explain, using Freudian theory, why Stuart became afraid.

(2)

Stuart is experiencing the Oedipus complex: he has unconscious sexual desire for his mother and sees his father as a rival for her affection. He fears that his more powerful father will punish him (castration anxiety), so he became afraid of going fishing alone with his father.

(Total for Question 5 = 3 marks)

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6 Shruthri was given a bag of sweets by her mother and told not to eat any before her dinner. Shruthri ate all the sweets.

(a) Explain, using Freudian theory, which part of Shruthri's personality was responsible for her behaviour.

(2)

The id was responsible. The id works on the pleasure principle and demands immediate gratification, so it wanted the sweets straight away, and Shruthri ate them all without thinking about her mother's rule.

(b) Explain, using Freudian theory, which part of Shruthri's personality should have stopped her eating all the sweets.

(2)

The superego should have stopped her. The superego is her moral conscience, formed from her parents' rules, so it should have controlled the demands of the id and made her feel guilty about disobeying her mother, stopping her eating the sweets before dinner.

(c) Explain **one** weakness of Freud's psychosexual stages of development.

(2)

Freud's stages stop at adolescence (the genital stage) and do not explain development during adulthood. Therefore the theory is not a complete explanation of human development, unlike Erikson's theory, which has stages across the whole lifespan.

(Total for Question 6 = 6 marks)

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7 Angela observed the behaviour of children aged two to five years in an early years setting in Canada. Each child was observed for five minutes and the number of times they played with each toy was recorded in **Table 2** below.

Boys	Number of times observed playing with cars	Number of times observed playing with dolls		Girls	Number of times observed playing with dolls	Number of times observed playing with cars
1	4	2		1	6	0
2	5	3		2	5	3
3	7	2		3	6	2
4	6	1		4	4	3
5	5	0		5	4	4

Table 2

(a) (i) Calculate the mean score for boys playing with cars using the results from **Table 2**.

(1)

Space provided for calculations

4 + 5 + 7 + 6 + 5 = 27

Mean = 27 ÷ 5 = 5.4

Mean score for **boys playing with cars** ..... 5.4 .....

(ii) Calculate the median score for girls playing with dolls using the results from **Table 2**.

(1)

Space provided for calculations

Girls playing with dolls in order: 4, 4, 5, 6, 6

Middle (3rd) score = 5

Median score for **girls playing with dolls** ..... 5 .....

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(b) Explain **one** strength and **one** weakness of using the observational research method in this study.

(4)

Strength

Angela observed the children playing in their natural early years setting, which is a normal environment for them. This means their play with cars and dolls is natural, so the study has high ecological validity for how children aged two to five really play.

Weakness

Each child was only observed for five minutes and Angela may not have seen or recorded all of their behaviour, for example if several children were playing at once. Therefore the results may be inaccurate and unreliable, and with only one observer inter-rater reliability cannot be checked.

(c) Angela used a chi-squared test to analyse the data from her study.

Justify the use of a chi-squared test for this data.

(2)

The data are nominal, as each observation is a count of how often children played in a category (cars or dolls). Angela was comparing boys and girls, who are different children, so it is an independent measures design, and chi-squared is the test for a difference with nominal data and independent groups.

(Total for Question 7 = 8 marks)

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8 Define the following classical conditioning terms.

(a) Spontaneous recovery

(1)

The return of a conditioned response to the conditioned stimulus after it had previously been extinguished, usually after a period of time.

(b) Extinction

(1)

The gradual disappearance of a conditioned response when the conditioned stimulus is repeatedly presented without the unconditioned stimulus.

(c) Stimulus generalisation

(1)

When a stimulus that is similar to the conditioned stimulus also produces the same conditioned response.

(d) Explain **two** strengths of classical conditioning as an explanation of learning.

(4)

1 *There is scientific evidence that behaviour can be learned by association. Watson and Rayner (1920) conditioned Little Albert to fear a white rat by pairing it with a loud noise, and his fear generalised to other furry objects, showing it can explain how fears and phobias are learned.*

2 *It has practical applications. Pavlov (1927) conditioned dogs to salivate to a bell by pairing it with food, and the same principles are used to train animals and in therapies such as systematic desensitisation for phobias, so it is a useful explanation of learning.*

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(e) Describe how you would use classical conditioning to train a dog to sit.

(2)

Gently pushing down on the dog's back end (UCS) makes it sit as a reflex (UCR). Just before each push, say the command "sit" (NS). After the command and the push are paired many times, the word "sit" alone becomes a conditioned stimulus that produces sitting as a conditioned response.

(Total for Question 8 = 9 marks)

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9 In learning theories and development, you will have covered a contemporary study by Capafóns et al (1998).

Evaluate the contemporary study by Capafóns et al (1998).

(8)

Capafóns et al. (1998) investigated whether systematic desensitisation reduces fear of flying. 41 participants with a fear of flying were randomly allocated to a treatment group or a waiting list control group, and the groups were matched on sex, age and self-reported fear level. Fear was measured before and after treatment using self-report questionnaires and physiological measures taken while participants watched a video of a flight in a flight simulator. The treatment group learned relaxation and worked through an anxiety hierarchy of flying situations. 90% of those who had desensitisation reduced their fear of flying, while the control group did not improve.

A strength is the careful control of the groups. Random allocation removes experimenter bias in deciding who gets treatment, and matching on sex, age and fear level removes participant variables, so any difference after the programme is likely to be caused by the desensitisation itself. This increases internal validity. The study also used both self-report and physiological measures, so the findings could be checked against each other, and the standardised programme means the study can be replicated to test reliability. It has practical value, as it shows a therapy that can help people overcome a phobia that affects their lives.

However, there are weaknesses. The self-report questionnaires may lack validity, as participants could have given the answers they thought Capafóns wanted to hear, for example saying their fear had reduced after the effort of treatment. The flight simulator is an artificial situation, so reduced fear in the simulator may not mean reduced fear on a real aeroplane, which lowers ecological validity. The sample of 41 participants from Spain is small, so the results may not generalise to people with a fear of flying in other cultures. The treatment was also not effective for 100% of participants, so an alternative such as cognitive behavioural therapy may be more

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effective for some people. There is also an ethical issue, as the control group had to wait for treatment while still experiencing their fear.

In conclusion, the study is well controlled and gives strong evidence that systematic desensitisation reduces fear of flying, but its reliance on self-report and a simulator means its findings should be applied to real flying with some caution.

(Total for Question 9 = 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.

10 Evaluate the role of internal pacemakers (body clock) and external zeitgebers in the regulation of the sleep-wake cycle.

(12)

The sleep-wake cycle is a circadian rhythm, as it lasts about 24 hours. It is controlled partly by an internal (endogenous) pacemaker, the body clock. The main pacemaker is the suprachiasmatic nucleus (SCN), a small group of cells in the hypothalamus. The SCN receives information about light from the eyes through the optic nerve, even when the eyes are closed, and sends messages to the pineal gland. In darkness the pineal gland releases more melatonin, which causes sleepiness, and in light melatonin release is reduced, so we wake. On its own the body clock is free running at slightly more than 24 hours, about 25 hours, so it is kept to 24 hours by external (exogenous) zeitgebers. The most important zeitgeber is light, which resets the SCN each day, and others include social cues such as mealtimes and alarm clocks.

There is evidence for an internal pacemaker. Siffre (1999) spent two months living in a cave without daylight or clocks, and his sleep-wake cycle continued but became longer than 24 hours. This shows the body clock works without external cues, but also that zeitgebers such as light are needed to keep it to 24 hours. Aschoff and Wever's bunker studies found similar free running cycles of about 25 hours when participants had no natural light. However, Siffre's study was a single person, so it may not represent everyone's sleep-wake cycle, and the participants in bunker studies were often still exposed to artificial light, which may have affected their rhythms.

Animal research supports the role of the SCN. Ralph et al. (1990) bred hamsters with abnormal circadian rhythms of 20 hours, and when their SCN cells were transplanted into normal hamsters whose own SCN had been removed, the normal hamsters took on the 20-hour

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rhythm. This gives strong, scientific evidence that the SCN is the main internal pacemaker. However, this research was done on animals, so generalising it to humans is difficult, and it raises ethical issues about harm to the hamsters.

The influence of zeitgebers is also limited. People living inside the Arctic Circle have winter days with very little daylight, yet they still keep a fairly normal sleep-wake pattern. If the cycle were controlled purely by light, they would sleep for most of the day, which suggests the internal clock and social cues are important too. Focusing on light and the SCN also oversimplifies the cycle, as other factors such as neurotransmitters, temperature and individual differences between "larks" and "owls" play a role.

In conclusion, neither the internal pacemaker nor external zeitgebers can explain the sleep-wake cycle alone. The evidence suggests that the SCN produces a roughly 25-hour rhythm and that zeitgebers, especially light, reset it each day, so the two work together to keep the cycle to 24 hours.

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(Total for Question 10 = 12 marks)

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11 A newspaper has claimed that playing violent video games has influenced a rise in teenage aggression within society, specifically with boys over 12 years of age.

A team of psychologists has been asked to conduct research investigating whether playing violent video games increases aggression in teenagers.

Assess whether PET scans or observations would be the most appropriate research method for this investigation.

You must make reference to the context in your answer.

(16)

A PET (positron emission tomography) scan involves injecting a radioactive tracer, usually attached to glucose, into the bloodstream. The most active areas of the brain use more glucose, and the scanner detects the tracer to produce a coloured image of brain activity which can be measured and compared between people. Observations involve watching and recording behaviour. In a structured observation the setting is planned and controlled, in a naturalistic observation participants are watched in their normal environment without manipulation, and in a participant observation the researcher joins in. Behaviour is usually recorded using behavioural categories and a tally chart.

PET scans could be used by scanning a sample of boys over 12 while they recall playing a violent video game, then comparing their brain activity with a group who recall a non-violent game. If the violent game group showed more activity in areas linked to aggression, such as the amygdala, and less in the prefrontal cortex, which controls impulses, this would suggest a link between violent games and aggression. A strength is that PET scans are objective and scientific, as the brain activity is measured by a machine rather than interpreted by a researcher, so the data are high in reliability, and the procedure could be replicated with different video games. They would allow the psychologists to see which parts of the brain are involved in any aggression caused by the games.

However, PET scans have serious problems for this investigation. They measure brain activity,

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not aggressive behaviour, so they cannot show whether the teenagers actually become more aggressive towards others, which is what the newspaper claimed. They cannot isolate which brain areas are solely responsible for aggression, as many areas are active at once, which reduces validity. Lying still in a scanner is very different from playing a game at home with friends, so the findings would lack ecological validity. There are also ethical problems: injecting radioactive tracers into healthy teenagers carries a small risk, and parental consent would be needed for boys under 16. PET scans are also very expensive, so only a small sample of boys could be used, which makes it hard to generalise to teenage boys in society.

Observations could be used in two ways. In a structured observation, groups of boys could be placed in a laboratory, play either violent or non-violent games, and then be observed during free play, with trained observers tallying aggressive acts such as hitting, pushing or verbal insults. The controlled setting allows extraneous variables, such as the length of play, to be controlled, so the study could be replicated, increasing reliability. In a naturalistic observation, boys could be observed in an arcade or a youth club playing violent games, and their behaviour recorded after the game ended. This would increase ecological validity, as the aggression is shown in their own video game environment.

Observations also have weaknesses. Interpreting what counts as aggression can be subjective, for example play fighting may be recorded as aggression, although this can be reduced by using clear behavioural categories and two observers to check inter-rater reliability. If the boys know they are being watched, they may change their behaviour, and in a participant observation the researcher joining in with the games might influence how the boys behave, reducing validity. Showing violent games to teenagers to see if they become aggressive also raises ethical issues of harm, so the researchers would need consent and should stop the game if aggression became dangerous. Naturalistic observations cannot control other variables, such as the boys' mood or

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home life, so cause and effect is hard to establish.

Overall, observations would be the most appropriate method for this investigation. The newspaper claimed that violent video games increase aggressive behaviour in teenage boys, and only observation measures that behaviour directly, while PET scans only show brain activity and are expensive, artificial and carry ethical risks. A structured observation would be the best choice, as it gives control and reliability while still recording real aggressive behaviour, and PET scans could be used afterwards to support the findings by showing which brain areas are involved.

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(Total for Question 11 = 16 marks)

TOTAL FOR SECTION C = 28 MARKS
TOTAL FOR PAPER = 96 MARKS

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