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

Tuesday 17 January 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 critical 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.
- 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.

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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 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 20 students' final examination results and the relationship of the results to the number of days absent in an academic year.

The researchers used a Spearman's rank test to analyse the data and found a correlation of -0.39 between final examination results and total number of days absent.

(a) Explain the type of correlation the researchers found.

(2)

The researchers found a negative correlation of −0.39, which is a weak to moderate relationship. This means that as the number of days absent increases, the final examination results tend to decrease, although the relationship is not strong as −0.39 is closer to 0 than to −1.

(b) State **two** reasons why the researchers used a Spearman's rank test.

(2)

1 *The researchers were looking for a relationship (correlation) between days absent and examination results, not a difference between two conditions.*

2 *The examination results are ordinal data (they can be put into rank order), so a non-parametric test of correlation such as Spearman's rank is needed.*

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The researchers used a Spearman's rank test and decided a directional (one-tailed) hypothesis at P<0.05 level of significance was appropriate.

(c) Describe whether the results of the researchers' investigation were significant at p<0.05 for a directional (one-tailed) test.

The critical value table can be found in the formulae and statistics table at the front of this paper.

(2)

The result was significant at p<0.05 (one-tailed). With n = 20 the critical value is 0.299, and the observed value of −0.39 (ignoring the sign, 0.39) is greater than 0.299, so the researchers can accept their directional hypothesis that more days absent is linked to lower results.

(Total for Question 1 = 6 marks)

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2 (a) Describe **one** hormone that may cause aggressive behaviour in males.

(2)

Testosterone is a male sex hormone (androgen) produced mainly by the testes, and higher levels are linked to more aggressive behaviour in males. Exposure to testosterone in the womb is thought to affect the development of neural pathways in the brain, for example in the amygdala and hypothalamus, making males more likely to react aggressively.

(b) Explain **one** strength and **one** weakness of research into the influence of hormones on aggressive behaviour.

(4)

Strength

There is supporting evidence. Dabbs et al. (1987) measured testosterone in the saliva of male prisoners and found higher levels in those who had committed violent crimes than in those who had committed non-violent crimes. This gives the hormonal explanation validity, as it links real aggressive behaviour to testosterone levels.

Weakness

Much of the research is correlational, so cause and effect cannot be established: aggression or competition may raise testosterone rather than the other way round. It also ignores other explanations, as social learning theory suggests aggression is learned by imitating aggressive role models rather than being caused by hormones.

(Total for Question 2 = 6 marks)

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QUESTION 3 BEGINS ON THE NEXT PAGE.

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3 A psychology research team decided to investigate whether temperature affects mood.

The team asked five volunteer participants to complete a self-report questionnaire about their mood when they were in a room that was at 11°C and then when they were in a room that was at 22°C. Participants were scored on a scale of 0 to 30, with 30 being a high positive mood score.

The results of the study are given in **Table 1** below.

Participant	Mood score (out of 30) in a room at 11°C	Mood score (out of 30) in a room at 22°C
1	10	15
2	10	20
3	5	15
4	15	25
5	20	30

Table 1

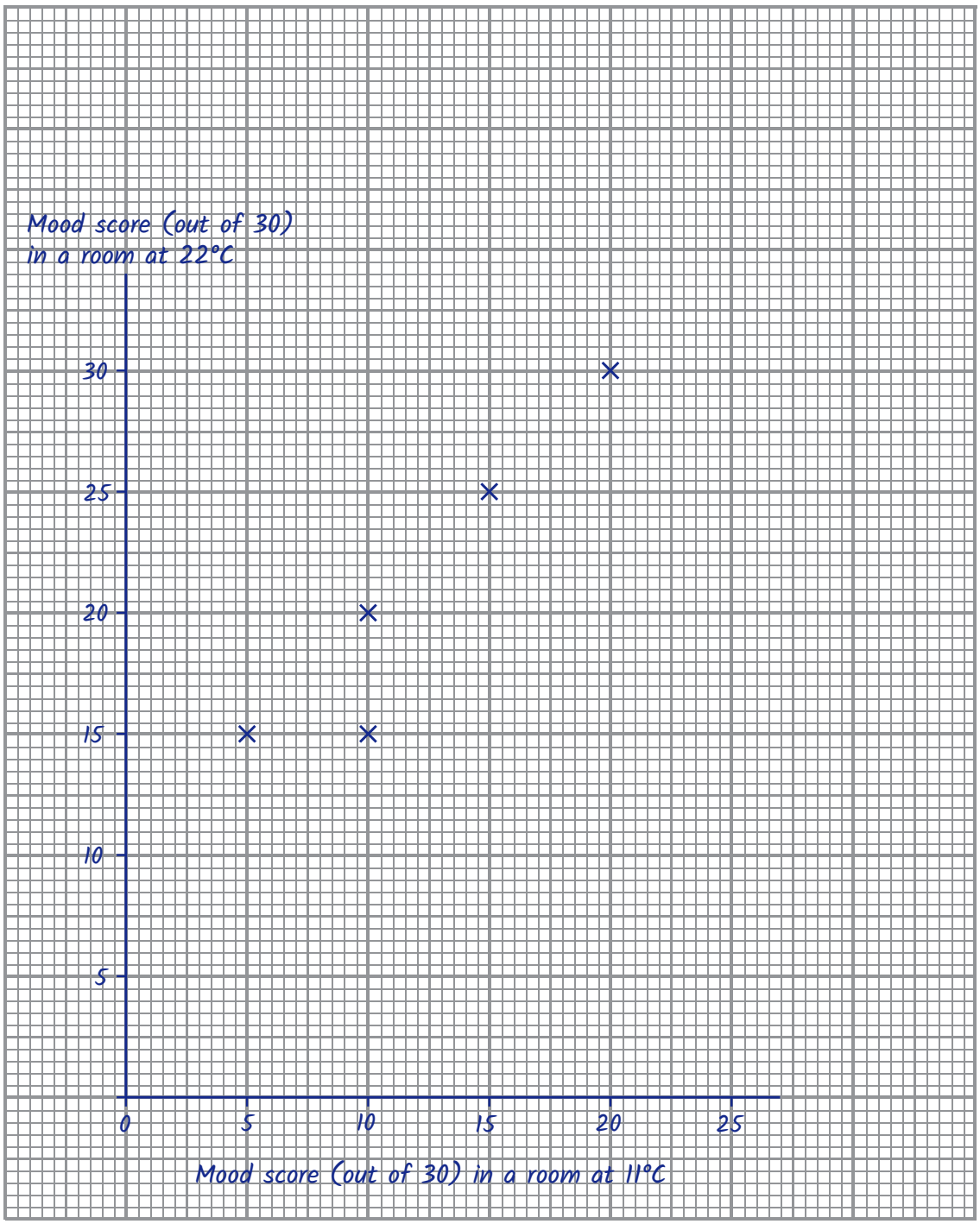
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(a) Draw a scatter diagram to represent the data in **Table 1**.

(3)

Title *Scatter diagram of mood scores at 11°C and 22°C (5 participants)*



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(b) State **one** conclusion that can be drawn from the data in **Table 1**.

(1)

All five participants had a higher mood score at 22°C than at 11°C, so mood is more positive in a warmer room.

(c) Explain **one** strength and **one** weakness of using self-report questionnaires to gather data on mood in this investigation.

(4)

Strength

Self-report questionnaires let the participants describe their own mood directly, rather than the researchers having to infer mood from behaviour. Mood is an internal state that cannot be observed, so asking the person gives more valid data, and the 0 to 30 score is quantitative so the two rooms can be compared easily.

Weakness

Participants may give socially desirable or untrue answers, for example not wanting to admit to being in a bad mood. Also, as they rated mood in both rooms, they may have guessed the aim and scored themselves higher in the warm room (demand characteristics), so the scores may not be a valid measure of their real mood.

(Total for Question 3 = 8 marks)

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4 Maria found that when she went to university her menstrual cycle synchronised with the menstrual cycles of the female students she lived with.

(a) Describe why Maria's menstrual cycle synchronised with the female students she lived with.

(4)

Maria's cycle probably synchronised because of pheromones. Pheromones are chemical messengers released in sweat, for example from the armpits, which are detected by smell by other people nearby, usually without them being aware of it. As Maria lives in close contact with the other female students, she is regularly exposed to their pheromones. These are thought to affect the release of hormones that control the timing of ovulation, so her cycle shortens or lengthens until it matches theirs. McClintock (1971) found that women living together in college dormitories developed synchronised cycles over time, which matches Maria's experience.

(b) Describe **one** psychological symptom that may be experienced during menstruation.

(2)

During menstruation a woman may experience low mood or mood disruption, such as irritability. For example, she may become angry or tearful in situations that would not normally upset her, and find it harder to cope with everyday stress.

(Total for Question 4 = 6 marks)

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5 Evaluate the use of the correlational research method in psychology.

(8)

Correlational research measures two co-variables to see whether there is a relationship between them, rather than manipulating an independent variable. A positive correlation is when one variable increases as the other increases, a negative correlation is when one increases as the other decreases, and no correlation is shown by a coefficient of 0. Data can be shown on a scatter diagram and analysed with an inferential test such as Spearman's rank, which gives a correlation coefficient from +1 (perfect positive) to −1 (perfect negative).

A strength is that correlations allow psychologists to study naturally occurring variables that it would be unethical or impractical to manipulate, such as days absent and exam results, or levels of testosterone and aggression. This means important real-world relationships can still be studied. A further strength is that a strong, significant correlation can suggest ideas for further experimental research, so it is a useful starting point for testing a cause and effect prediction. Correlations are also quick to carry out and can use existing data, and as the data are quantitative they can be tested for significance, making the results more objective and easy to compare.

However, the main weakness is that correlation does not show cause and effect. Even if two variables are linked, it cannot be said that one causes the other, as the relationship may go in either direction or both variables may be caused by a third variable. For example, absence and low exam results could both be caused by illness. This links to a second weakness: extraneous variables are not controlled as they would be in a laboratory experiment, so the validity of any conclusion is reduced. Correlations can also miss curvilinear relationships, as Spearman's rank only detects relationships that move consistently in one direction.

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In conclusion, the correlational method is valuable for identifying relationships, especially where experiments would be unethical, but its findings must be interpreted carefully because they cannot show causation, so it is best used alongside experimental methods.

(Total for Question 5 = 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.

6 Researchers were asked to plan a study to test whether children's television programmes showed positive or negative role model behaviour.

(a) Describe how the researchers could carry out a content analysis for their study.

(4)

The researchers would first choose a sample of children's television programmes, for example popular programmes broadcast at the same time of day. They would then decide on behavioural categories for positive role model behaviour (such as sharing or helping) and negative role model behaviour (such as hitting or name calling). They could watch one programme together as a pilot to standardise the categories and how to interpret them. They would then watch each programme and record each time a behaviour occurs on a tally chart, then total the tallies.

(b) Explain **one** weakness of content analysis.

(2)

The categories used in content analysis can be subjective, as the researcher decides what counts as a positive or negative behaviour. This means different researchers may put the same behaviour into different categories, so the results may be unreliable and low in inter-rater reliability.

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(c) The mean scores of the data gathered for positive and negative role model behaviour in **five** children's television programmes are displayed in **Table 2**.

Mean score for observed positive role model behaviours	Mean score for observed negative role model behaviours
12	28

Table 2

Suggest why the researchers could select a standard deviation as an appropriate measure of dispersion.

(1)

The standard deviation uses every score and minimises the effect of extreme scores, so it gives a more accurate measure of spread than the range.

(d) Convert the mean scores for positive and negative role model behaviours in **Table 2** to a ratio.

(1)

Space for calculations

12 : 28

÷ 4 on both sides ⇒ 3 : 7

Ratio *3 : 7*

(e) Explain **one** weakness of the sample used in this study.

(2)

Only five children's television programmes were used, which is a small sample. These five programmes may not be representative of all children's programmes, for example if they were all cartoons, so the results cannot be generalised to all children's television.

(Total for Question 6 = 10 marks)

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7 Rina wants to encourage her three-year-old daughter Sangita to clean her teeth.

Describe how Rina could encourage Sangita to clean her teeth using principles from operant conditioning.

(4)

Rina could use positive reinforcement. Each time Sangita cleans her teeth, Rina gives her a pleasant consequence such as praise or a sticker on a chart, which makes it more likely that Sangita will repeat the behaviour. She could use shaping, first rewarding Sangita for picking up the brush, then for brushing a few teeth, and finally only for brushing all her teeth properly. The reward should be given immediately after brushing so that Sangita links the two. Rina could also use punishment, so if Sangita refuses to clean her teeth she is told off or loses a privilege such as a bedtime story, which makes the refusal less likely to happen again.

(Total for Question 7 = 4 marks)

8 During your course you will have learned about Capafóns et al's (1998) contemporary study.

(a) Identify **two** aims of Capafóns et al's (1998) contemporary study.

(2)

1 *To assess how effective systematic desensitisation is as a therapy for reducing fear of flying.*

2 *To see whether the treatment reduces both physiological responses and self-reported anxiety when people with a fear of flying are exposed to flight-related situations.*

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(b) Describe the procedure used in Capafóns et al's (1998) contemporary study.

(4)

Participants with a fear of flying were interviewed individually by the research team and completed questionnaires about their fear. They were placed in either a treatment group or a matched waiting list control group. Before and after treatment, they took part in a fear of flying test in a flight simulator, where they watched a video-tape of a plane journey with sound effects while their physiological responses, such as heart rate and skin conductance, were recorded. The treatment group had two 1-hour sessions per week of a standardised individual desensitisation programme, learning relaxation and working through an anxiety hierarchy of flying situations.

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(c) Explain **one** strength and **one** weakness of Capafóns et al's (1998) contemporary study.

(4)

Strength

The treatment and control groups were carefully matched, so any difference in fear after the programme is likely to be due to the systematic desensitisation and not participant variables, which increases the validity of the results.

Weakness

The fear of flying test used an artificial scenario, a video recording of a flight in a simulator. This lacks ecological validity, as participants were not actually flying, so their fear in a real aeroplane may be different.

(d) Justify **one** improvement that could be made to the sample used by Capafóns et al. (1998) in their contemporary study.

(2)

They could use a larger sample from several countries rather than only Spain. This would make the sample more representative, so the findings about how effective systematic desensitisation is could be generalised to more people with a fear of flying.

(Total for Question 8 = 12 marks)

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9 Evaluate Freud's psychosexual stages in the development of personality.

(8)

Freud proposed that personality develops through five psychosexual stages, and that early experiences shape adult personality. In each stage the libido is focused on a different part of the body. In the oral stage (0 to 1 year) pleasure comes from sucking and biting, and in the anal stage (1 to 3 years) from controlling the bowels during toilet training. In the phallic stage (3 to 6 years) boys experience the Oedipus complex, having unconscious sexual feelings for their mother and seeing their father as a rival, which is resolved by identifying with the father and so developing the superego. This is followed by the latency stage and finally the genital stage at puberty. If a child is frustrated or overindulged at a stage they may become fixated, for example oral fixation leading to smoking or overeating in adulthood.

One strength is that there is some supporting evidence. In the case study of Little Hans, Freud interpreted Hans's fear of horses as a displaced fear of his father, which he saw as support for the Oedipus complex. The theory also has practical applications, as it highlights how traumatic experiences in childhood may have long-term effects on adult personality, which has influenced therapy and child care.

However, the theory cannot be scientifically tested. Concepts such as the libido and unconscious desires cannot be measured, so the stages are unfalsifiable. The evidence comes mainly from case studies, and Little Hans was studied largely through letters from his father, who was a supporter of Freud, so the interpretations may be biased. The theory is also limited because the stages end at adolescence, whereas Erikson suggested that development continues throughout life in eight psychosocial stages. It also focuses on boys and says little about how girls develop.

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In conclusion, Freud's stages were influential in showing the importance of childhood experiences, but because they rely on subjective case studies and cannot be measured, they have limited scientific credibility as an explanation of personality.

(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 The structure of the brain, different brain areas and brain functioning have been put forward as an explanation of human aggression.

To what extent do you agree that this is a complete explanation of human aggression?

(12)

Biological psychologists argue that aggression is caused by the structure and functioning of the brain. The prefrontal cortex is involved in regulating emotions and controlling impulses, so damage to or reduced activity in this area may lead to a lack of control and impulsive aggression. The limbic system, including the amygdala and hypothalamus, is involved in emotion and self-preservation such as fight or flight, and the hypothalamus is claimed to be responsible for regulating aggressive behaviour. Neurotransmitters also play a role, as low levels of serotonin have been linked to an increase in impulsive and aggressive behaviour, because serotonin normally has a calming, inhibiting effect.

There is evidence to support this. Raine et al. (1997) used PET scans to compare murderers who pleaded not guilty by reason of insanity with matched controls. The murderers had lower activity in the prefrontal cortex and differences in limbic areas such as the amygdala, which suggests brain functioning is linked to violent behaviour. As PET scans are objective and scientific, this gives the explanation credibility. However, the sample was a very specific group, so the findings may not generalise to everyday aggression, and Raine et al. themselves stated that brain differences do not cause violence on their own. The data are also correlational, so the brain differences could be a result of other factors such as childhood abuse.

Brain structure also ignores other biological factors. Testosterone levels rise at puberty, which matches a peak in aggressive behaviour in young males, and Dabbs et al. (1987) found higher testosterone in the saliva of prisoners who had committed violent crimes than non-violent ones.

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This suggests hormones are also involved, so brain structure alone is not a complete explanation.

Psychological explanations also challenge the biological view. Social learning theory suggests that aggression is learned by observing and imitating aggressive role models. Bandura et al. (1961) found that children who had watched an adult hit a Bobo doll were more likely to behave aggressively towards the doll themselves, which shows that aggression can be learned from the environment rather than coming from the brain. Deindividuation suggests that people behave more aggressively when they lose their sense of individual identity in a crowd, which explains why aggression varies with the situation, something brain structure cannot explain as it stays the same. Freud's psychodynamic theory also offers an alternative, seeing aggression as an outlet for the death instinct, Thanatos. The fact that levels of aggression differ greatly between cultures also suggests that social factors are important.

To a large extent I disagree that brain structure and functioning is a complete explanation. There is good scientific evidence that brain areas such as the prefrontal cortex and limbic system are involved in aggression, but the explanation is reductionist, as it ignores hormones, learning, situational factors and culture. A more complete explanation is an interactionist one, where a biological predisposition in the brain is triggered by environmental factors such as aggressive role models or being in a crowd.

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(Total for Question 10 = 12 marks)

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11 In your psychology course you will have learned about both biological and learning and development therapies.

Afia's Seasonal Affective Disorder seems to get worse in the winter and it has been suggested that she undergo light therapy.

Assess whether this is the only therapy Afia should consider.

(16)

Seasonal Affective Disorder (SAD) is a mood disorder where depressive symptoms vary with the seasons, usually becoming worse in winter. It is thought to be caused by shorter days and less daylight, which leads the pineal gland to release more melatonin and lowers serotonin levels, disrupting the circadian rhythm. Afia's symptoms getting worse in the winter fit this pattern well.

Light therapy involves sitting in front of a light box that gives off bright artificial light, usually for about 30 minutes or more each morning. The light reduces melatonin secretion and helps reset the body clock. Treatment usually begins in autumn, around a week before symptoms are expected, and can continue through the winter. This suits Afia, as she only has mood problems at certain times of the year, so she may only need treatment during the winter months rather than all year. It is non-invasive and can be done at home, for example while she eats breakfast, so it fits into her daily routine. There is evidence for its effectiveness: Eastman et al. found that bright morning light reduced symptoms of SAD significantly more than a placebo device. If Afia tries light therapy and her symptoms reduce, she will know it is working for her.

However, light therapy has limitations. It can have mild side effects such as headaches, eye strain and insomnia, especially if used later in the day, which could make Afia feel worse. It cannot be used if she has certain eye conditions, as the bright light could make them worse. In the Eastman et al. study the placebo also produced some improvement, which suggests part of the effect may be due to expectations. Light therapy also only treats the symptoms while it is being used, so Afia would need to repeat it every winter.

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A biological alternative is antidepressant drugs such as selective serotonin reuptake inhibitors (SSRIs), which block the reuptake of serotonin so more remains in the synapse, improving mood. SSRIs can be started before the usual onset of SAD to prevent symptoms, and they are easy to take. However, they can take several weeks to work and have side effects such as nausea and sleep problems, and Afia may prefer not to take mood altering drugs if her problem is only seasonal.

Afia could also consider a psychological therapy such as psychoanalysis. Here she would talk about her early experiences with a therapist, using techniques such as free association, where she says whatever comes to mind, to bring unconscious conflicts that may be contributing to her low mood into conscious awareness so they can be resolved. Psychotherapy has no physical side effects, so it may be less distressing than drug treatment, and it treats possible underlying causes rather than just symptoms. However, it can take many sessions before it begins to be effective, it is expensive, and it does not address the clear seasonal, biological pattern in Afia's symptoms.

In conclusion, light therapy should not be the only therapy Afia considers, although it is probably the best first choice. It directly targets the lack of daylight that seems to cause her winter symptoms, it is supported by evidence and it has fewer side effects than drugs. If her symptoms are severe or do not improve, SSRIs could be used alongside light therapy, and if there are underlying psychological problems, a talking therapy could help. A combined approach, chosen to suit Afia's symptoms and preferences, is likely to be most effective.

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